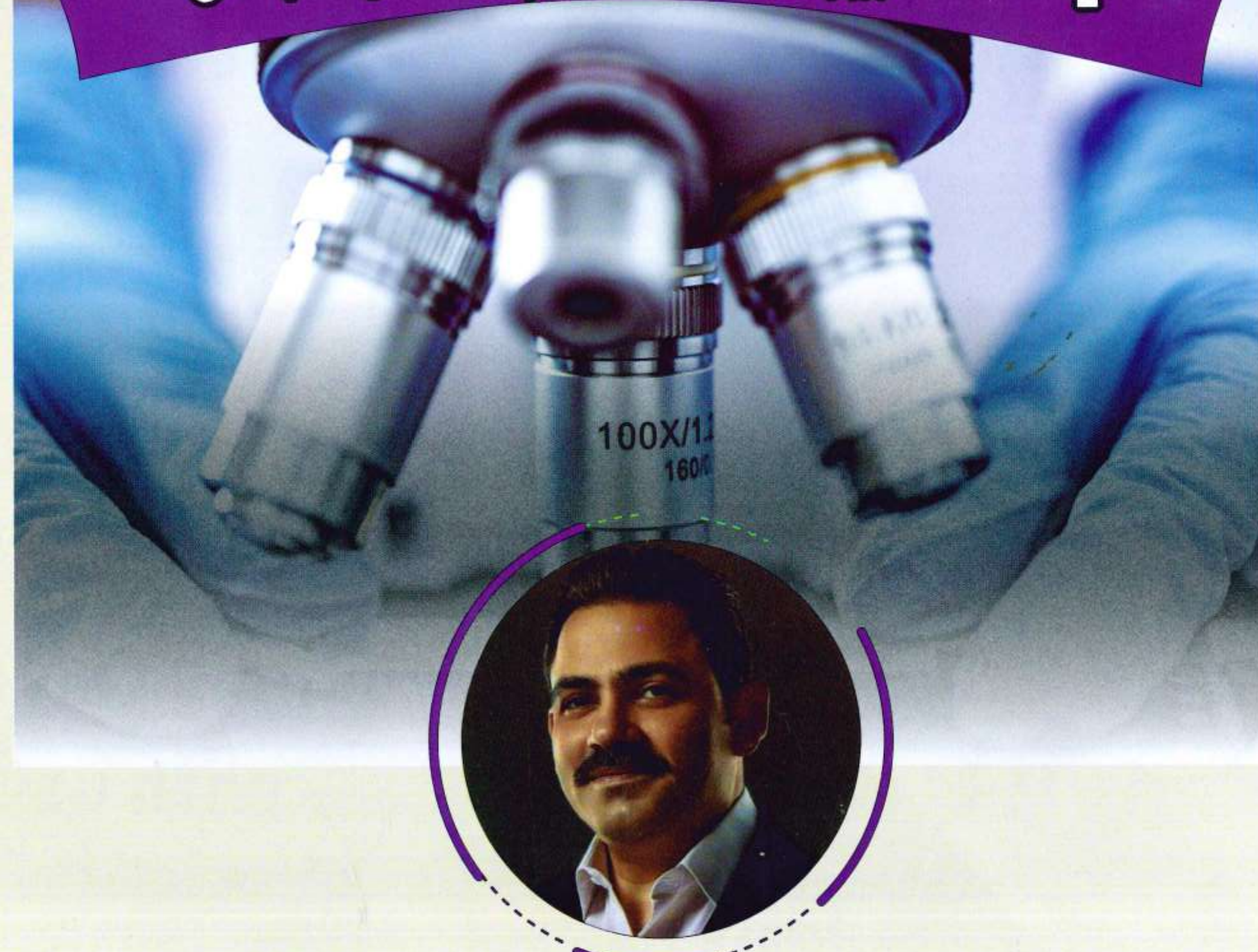


رئيس مجلس الإدارة
إيـــاد أبـــوالحجـــاج
الجمهورية
التعليمي
رئيس التحرير
عبد الـرازق توفيـق
MINISTRY OF EDUCATION AND TECHNICAL EDUCATION
2025
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الإشراف العام
محمد بهاء الدين

إعداد خبير الامتحانات وصانع الأوائل



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مع العدد بوستر هدية مجانية

بابل شيت يدربك على طريقة الإجابة

3rd Sec



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Chemistry



Chapter 1

Transition Elements

40 ideas for properties of the first transition series

1 If (n) is order of a main transition series, so the outermost sublevel that is successively filled is ....

ⓐ (n+2) d
ⓑ (n+3) d
ⓒ (n-2) d
ⓓ (n+4) d

2 The transition elements in second transition series have .... completely filled sublevels

ⓐ 10
ⓑ 7
ⓒ 9
ⓓ 13

3 What is the electronic configuration of the element exists between element X whose +3 ion configuration is $[_{18}Ar]\ 3d^5$ and element Y whose +2 ion configuration is $[_{18}Ar]\ 3d^8$?

ⓐ $[_{18}Ar]\ 4s^1\ 3d^{10}$
ⓑ $[_{18}Ar]\ 4s^2\ 3d^5$
ⓒ $[_{18}Ar]\ 4s^2\ 3d^7$
ⓓ $[_{18}Ar]\ 4s^1\ 3d^5$

4 The number of elements in first transition series which have only one half-filled sublevel in atomic state is ......

ⓐ 3
ⓑ 1
ⓒ 2
ⓓ 0

5 Which one of the following doesn't correctly represent the correct order of the property indicated against it?

ⓐ Ti< V< Cr< Mn (according to conductivity) .
ⓑ Ti< V< Mn< Cr : increasing 2nd ionization potential .
ⓒ V<Ti< Cr< Mn : maximum of oxidation states .
ⓓ more than one correct .

6 X is an element from fourth period its ionization potential values in KJ are:

1st	2nd	3rd	4th
524	982	1755	5434

The correct statement is

ⓐ X locate in group 3B and has oxidation state 3+ only .
ⓑ X is the first most abundant metal in earth's crust .
ⓒ XO_2 is paramagnetic and exist in nature .
ⓓ more than one correct .

7 All the following elements,their atoms reach state 2+ by losing a pair of electrons from the same orbital except

ⓐ $_{47}W$
ⓑ $_{56}Ba$
ⓒ $_{22}Ti$
ⓓ $_{80}Hg$

8 (X&Y) are two successive elements from first transition elements , If element Y is the last element that can lose all of 4s and 3d electrons ,so Ionization potential of X that's can break completely filled level of noble gas is......

ⓐ 9th
ⓑ 7th
ⓒ 8th
ⓓ 10th

9 All the following compounds contain transition element that lost from d sublevel only one electron except

ⓐ $ScCl_3$
ⓑ CrO
ⓒ $CuSO_4$
ⓓ CoO

10 Which of the following couldn't be oxidized?

ⓐ FeO
ⓑ K_2MnO_4
ⓒ Cr_2O_3
ⓓ $K_2Cr_2O_7$

11 In this shape a part of one of transition series:

A	B	C	D	E (IB)	G

Element that energy of its ion in oxidation state 3+ > 2+:

ⓐ C
ⓑ B
ⓒ A
ⓓ G

12 The number of transition elements in 2nd and 3rd transition series is ......

ⓐ 10
ⓑ 9
ⓒ 20
ⓓ 18

13 A, B, C and D four successive elements, their atomic masses are 47.9, 51, 52 and 54.9 respectively. Which of the following choices represent the same arrangement of atomic masses.

ⓐ atomic radius .
ⓑ density .
ⓒ chemical activity .
ⓓ more than one correct .

14 The following are electronic configuration of ions in their 2+ oxidation state which of them has the highest radius and lowest density?

ⓐ $[_{18}Ar],\ 3d^2$
ⓑ $[_{18}Ar],\ 3d^7$
ⓒ $[_{18}Ar],3d^4$
ⓓ $[_{18}Ar],\ 3d^6$

15 Compound of transition element X is used as fungicide, and its maximum oxidation state doesn't exceed group number, so the magnetic property of the element before it is in atomic state ....

ⓐ paramagnetic and its magnetic moment is 5 .
ⓑ paramagnetic and its magnetic moment is 4 .
ⓒ paramagnetic and its magnetic moment is 6 .
ⓓ diamagnetic and its magnetic moment is 6 .

16 All the following can be attracted to magnet by same strength in both of atomic and oxidation state (2+) except .....

ⓐ 22 ⓒ 25
ⓑ 24 ⓓ 26

17 In the periodic table, d-block elements are located between groups .... and.....

ⓐ 2A, 2B ⓒ 2A, 3A
ⓑ 1B, 2A ⓓ 3B, 2B

18 The two elements which are attracted to magnet by the same force are found in .... Group & .... column in periodic table

ⓐ IIB , 7
ⓑ VIB , 9
ⓒ IVB , 10
ⓓ more than one is correct

19 XSO_4 has blue color due to........

ⓐ its electronic configuration of X ion in this compound $[_{18}Ar],3d^{10}$.
ⓑ X^{2+} absorb the energy of blue light .
ⓒ X^{2+} absorb the energy of orange light .
ⓓ X^{2+} absorb all colors except red from the sun light .

20 An element X replaces hydrogen of water through a vigorous reaction so ,the formed compound ....

ⓐ absorb all 7 colors of visible light .
ⓑ absorb a certain color , it will appear by it's complementary color .
ⓒ not absorb any color , so appears colorless .
ⓓ absorb blue color , it will appear green color .

21 The element (X) is a transition element lies in the fourth period , it has the highest possible oxidation state, it is possible to form all the following compounds except ....

ⓐ XCl_3 ⓒ XCl
ⓑ XCl_2 ⓓ XCl_4

22 A main transition element , one of its oxidation states (X^{+3}) causes that the (d) sublevel contains two electrons , the ionization potential of this element will be very high in oxidation state ......

ⓐ X^{4+} ⓒ X^{5+}
ⓑ X^{3+} ⓓ X^{6+}

23 The element (X) is a one of the coinage transition elements , the compounds which proves that it is a transition elements are ....

ⓐ X_2O_3 , X_2O ⓒ X_2O_3 , XO
ⓑ XCl , XO ⓓ X_2O_3 , XCl

24 Which one of the following transition elements has the highest 1st ionization potential?

ⓐ $V \rightarrow V^+$ ⓒ $Sc \rightarrow Sc^+$
ⓑ $Ni \rightarrow Ni^+$ ⓓ $Ti \rightarrow Ti^+$

25 X,Y,Z and L represent four transition elements and their oxides are X_2O_5, Y_2O_3, ZO_2 and L_2O The right arrangement for their oxidation number in these oxides is ......

ⓐ L<Y < Z < X ⓒ L < Y<X<Z
ⓑ L<Z<Y<X ⓓ Y < L < Z < X

26 If the electronic configuration of element (X) is ended by $3d^7$, So the compound XCl_3 is...

ⓐ colorless and doesn't contain unpaired electrons .
ⓑ colored and contains 2 unpaired electrons .
ⓒ colored and contains 4 unpaired electrons .
ⓓ colorless and contains 3 unpaired electrons .

27 which of the following processes cannot happen ?

ⓐ $Zn^{2+} \rightarrow Zn^{3+}$ ⓒ $V^{2+} \rightarrow V^{3+}$
ⓑ $Ti^{2+} \rightarrow Ti^{3+}$ ⓓ $Fe^{2+} \rightarrow Fe^{3+}$

28 element X is from first transition series the electronic configuration of one of its ions is $[_{18}Ar]3d^5$ So element X is ....

ⓐ Zn ⓒ Sc
ⓑ V ⓓ Fe

29 Element (X) is a representative element located in period two and its outermost sublevel contains 4 electrons is mixed with element (Y) which is main transition element located in first transition series and its atom contains 4 unpaired electrons .... is formed.

ⓐ intermetallic alloy
ⓑ interstitial alloy
ⓒ substitutional and interstitial alloy
ⓓ intermetallic and substitutional alloy

30 Element X from the first transition series and it is difficultly reduced from X^{3+} to X^{2+} in normal conditions so the element X is ...

ⓐ Fe ⓒ Co
ⓑ Mn ⓓ Ni

31 Four elements A, B, C, D characterized by the following properties:
- element (A) locates in group 3A
- element (B) with tin forming bronze alloy
- element (C) used as catalyst in manufacture of ammonia
- element (D) non transition located in d block
To cover metallic body by yellow copper we used...........

ⓐ B, D
ⓑ A, C
ⓒ B, A
ⓓ C, D

32 The magnetic moment μ of the atom or ion is calculated from the relation $\mu = \sqrt{n(n+2)}$, where n is the number of unpaired electrons, and the value estimated in (BM) What's the oxidation number of manganese when it's μ value is 3.87 BM?

ⓐ +2
ⓑ +3
ⓒ +4
ⓓ +5

33 What is the chemical formula of the product of the reaction of yttrium ($_{39}Y$) with chlorine under the suitable conditions? ....

ⓐ Y_2Cl_3
ⓑ YCl_2
ⓒ YCl_3
ⓓ YCl

34 The elements of d-block are formed from 10 vertical columns so, the electronic structure of the elements of the column before last

ⓐ ns^2, $(n-1)d^9$
ⓑ ns^1, $(n-1)d^9$
ⓒ ns^2, $(n-1)d^{10}$
ⓓ ns^1, $(n-1)d^{10}$

35 If you have four elements (A), (B), (C) and (D), the element (A) has no colored compounds, the element (B) has an oxide used in manufacture of dyes, element (C) used in the manufacture of MIG fighter jets and the element (D) has maximum oxidation number in its ion, so these elements are .... respectively.

ⓐ zinc-vanadium-scandium-manganese
ⓑ manganese-vanadium-titanium-zinc
ⓒ vanadium-zinc-manganese-titanium
ⓓ zinc-manganese-titanium-vanadium

36 The following table includes some properties for the elements A and B:

Symbol	No. of 3d electrons	Oxidation states
A	10 electrons	Only one
B	10 electrons	More than one

All the following are correct except ....

ⓐ Both of A and B forming brass alloy
ⓑ Element B gives oxidation state exceeds its group number
ⓒ Element B is considered a non-transition element
ⓓ Compounds of element A forming colorless solutions

37 A brittle transition metal (X) when it mixed with iron at high temperature, a harder alloy than steel is formed. So, the compound XO_2 may be used in manufacture of ....

ⓐ dry cells and as a catalyst in preparation of oxygen gas
ⓑ sun protection cosmetics and as a catalyst in decomposition of H_2O_2
ⓒ dyes and as a reducing agent in preparation of iron
ⓓ fungicides and space shuttle

38 Two elements A and B from the 1st transition series each of them forms with aluminum an intermetallic alloy and the maximum oxidation state for the element A decreased than its group number. So number of single electrons in sublevel 3d of element B is.........

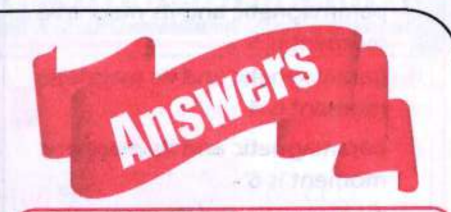
ⓐ zero
ⓑ 1
ⓒ 2
ⓓ 3

39 To reach maximum oxidation state of element (A) the number of lost electrons from 3d-sublevel equals half no. of lost from 4s sublevel, so element A ....

ⓐ forms alloy with aluminum which is characterized by being hard and light
ⓑ forms alloy with manganese which resists corrosion
ⓒ used in manufacture of strong magnetic conductor
ⓓ its oxide used in manufacture of dry battery

40 If the magnetic moment for a divalent ion of transition element in period 4 is 3 So, its atomic number equals ....

ⓐ 24
ⓑ 25
ⓒ 26
ⓓ 27



No.	Answer	No.	Answer
1	A	2	C
3	C	4	C
5	C	6	A
7	A	8	B
9	D	10	D
11	B	12	D
13	B	14	A
15	C	16	B
17	C	18	C
19	C	20	C
21	C	22	D
23	C	24	B
25	A	26	C
27	A	28	D
29	B	30	A
31	A	32	C
33	C	34	D
35	A	36	C
37	A	38	A
39	A	40	D

Transition Elements






عدد خاص

40 ideas for Iron & its compounds

1 Performing these steps: Oxidation, then reduction are enough to convert ....

ⓐ iron II sulphate into iron metal.
ⓑ iron II oxide into black oxide.
ⓒ iron metal into iron II oxide.
ⓓ more than one correct

2 Arrange the following steps to obtain iron II chloride from iron III chloride ?

ⓐ Reaction with diluted acid – reduction over 700°C – heating over 200°C – reaction with basic solution.
ⓑ Reaction with basic solution – heating over 200°C – reduction at 280°C – reaction with concentrated acid.
ⓒ Reaction with basic solution – heating over 200°C – reduction at 880°C – reaction with chlorine gas.
ⓓ Reaction with basic solution – heating over 200°C – reduction over 700°C – reaction with diluted acid.

3 Iron (III) oxide can be obtained by heating these compounds strongly in absence of air, except ....

ⓐ iron (II) sulphate.
ⓑ iron (II) oxalate.
ⓒ iron (III) hydroxide.
ⓓ hydrated iron (III) oxide.

4 By heating all the following compounds in air, the oxidation states of iron are changed except ....

ⓐ $FeSO_4$ ⓒ Fe_3O_4
ⓑ $FeCO_3$ ⓓ $Fe(OH)_3$

5 Two different solutions X & Y of the same acid ; if you know that X reacts with iron and produces iron II salt only while Y reacts with iron and produces mixture of iron salts, which one of them can react with iron oxide that has highest oxidation state ?

ⓐ X and produces iron III salt & water.
ⓑ Y and produces iron III salt & water.
ⓒ X and produces mixture of iron salts & water.
ⓓ Y and produces mixture of iron salts & water.

6 Study the following table then choose the correct one knowing That A & B are iron oxides

Iron	Reaction with dil. H_2SO_4	Reaction with conc. H_2SO_4
A	React	React
B	Not react	React

ⓐ (A) can be obtained by oxidation of (B)
ⓑ (A) can be obtained by reduction of (B).
ⓒ (A) composed of two oxides.
ⓓ (B) reacts with acid to produce iron II salt only.

7 The products of adding dil. HCl to mixture of Fe & Fe_2O_3 then heating in closed container at 500°C are.................
(Assume all reactions occur consume all reactants amounts with no remains).

ⓐ $FeCl_2$, FeO, H_2O
ⓑ $FeCl_2$, Fe_2O_3, H_2
ⓒ $FeCl_2$, Fe_2O_3
ⓓ $FeCl_3$, $FeCl_2$

8 By passing CO on hematite at 240°C and 625°C produce two products which can be differentiated by

ⓐ oxidation.
ⓑ adding dil. HCl.
ⓒ the color.
ⓓ solubility in water.

9 Roasted iron ores ....

ⓐ contain iron ions with half filled (d) orbitals.
ⓑ are used directly in open hearth furnace to produce steel.
ⓒ contain iron in percentage 35%.
ⓓ more than one correct.

10 What is the chemical formula of Goethite ore of iron ? ....

ⓐ $FeCO_3$ ⓒ Fe_2O_3
ⓑ FeO(OH) ⓓ Fe_3O_4

11 If you know that the size of iron ore which is suitable for reduction is 30 : 90 mm^3 ,which of the following is correct?

ⓐ The size of particles which is produced from cleaning furnace may be 15 mm^3
ⓑ The size of particles that must be crushed is 81 mm^3
ⓒ Sintering process occurred to particles with size 45 mm^3
ⓓ More than one correct

12 By adding 50 g of dil. HCl to 70 g of iron fillings in a container after a while ....

ⓐ the mass of container may be = 120 g.
ⓑ the mass of container may be = 110 g.
ⓒ the mass of container may be = 140 g.
ⓓ no reaction occurs.

13 If you have two alloys, the 1st (Zn + Fe) and the 2nd (Zn + Cu).
- How can you differentiate practically between them? By adding ....

ⓐ Diluted HCl, the 2nd alloy dissolves while the 1st doesn't.
ⓑ Diluted HCl, the 1st alloy dissolves and copper precipitates from the 2nd alloy.
ⓒ Conc. HNO_3, the 1st alloy dissolves and copper precipitates from the 2nd alloy.
ⓓ Conc. HNO_3 , both of the 1st and the 2nd alloys will dissolve.

14 A,B,C are three iron oxides if you know that (A: never be oxidized , B: can react with diluted acid , C: consider mixture of A & b).
Which of them used to as source of iron metal in furnace ?

ⓐ A ⓒ D
ⓑ B ⓓ another

15 By heating $FeSO_4.7H_2O$ strongly, ... is formed while on dissolving $Fe_2(SO_4)_3.9H_2O$ crystals in water then adding ammonia solution, ... ppt. is formed. So, which of the following choices is correct?

ⓐ FeO / greenish white.
ⓑ Fe_2O_3 / greenish white.
ⓒ FeO / reddish brown .
ⓓ Fe_2O_3 / reddish brown .

16 Performing these steps: Adding conc. HCl then adding ammonium hydroxide solution, Are enough to convert ....

ⓐ iron II sulphate into iron metal.
ⓑ iron II oxide into black oxide.
ⓒ iron metal into iron II oxide.
ⓓ iron III oxide into iron III hydroxide.

17 We can get mixture of two precipitates by ....

ⓐ reduction of hematite in blast furnace then adding conc. Sulphuric acid then adding NaOH.
ⓑ reduction of hematite in electric furnace then adding conc. Sulphuric acid then adding KOH.
ⓒ adding chlorine gas to red hot iron then adding KOH .
ⓓ more than one are correct.

18 $A \xrightarrow{300°C} B + H_2O$, $B + H_2 \xrightarrow{690°C} C + H_2O$, $C + H_2SO_4 \xrightarrow{conc.} D + H_2O$
Knowing that B is iron oxide , which of the following is correct ?

ⓐ B and C are black .
ⓑ C can be produced from thermal decomposition of organic salt in absence of air .
ⓒ D is difficult to oxidized .
ⓓ A is produced from reaction of sodium hydroxide with iron II salt .

19 We can get iron II sulphate from solid non-metal by..........

ⓐ oxidation of impurities then using contact method then adding iron fillings .
ⓑ adding iron to dil. sulphuric acid.
ⓒ heating iron with conc. sulphur.
ⓓ more than one are correct .

20 We can convert black ore into the compound which is decomposed to iron III oxide and water by......

ⓐ roasting – reduction at blast furnace then heating with chlorine gas – then adding sodium hydroxide solution then thermal decomposition .
ⓑ roasting – reduction at blast furnace then adding dil. HCl – then adding sodium hydroxide.
ⓒ adding conc. Sulphuric acid then thermal decomposition .
ⓓ roasting – reduction at blast furnace then heating with chlorine gas – then adding sodium hydroxide solution .

21 A student added ammonium hydroxide reagent to one of iron II salt solution, so a precipitate with unexpected color is formed, this is may be as a result of ....

ⓐ using wrong reagent.
ⓑ the reagent is strong base.
ⓒ the reaction needs for heating.
ⓓ the salt is mixed with another salts.

22 To get magnetic iron oxide from iron III chloride we follow the processes:

ⓐ reaction with hydrochloric acid/ oxidation/ reduction.
ⓑ reaction with alkali/ thermal decomposition/ reduction.
ⓒ oxidation/ reduction/ thermal decomposition.
ⓓ thermal decomposition/ oxidation/ reaction with alkali.

23 Iron fillings can be used to differentiate between.........

ⓐ Iron II sulphate and iron III sulphate.
ⓑ Diluted hydrochloric acid and diluted sulphuric acid.
ⓒ Concentrated sluphuric acid and concentrated nitric acid.
ⓓ Iron III oxide and iron III sulphate.

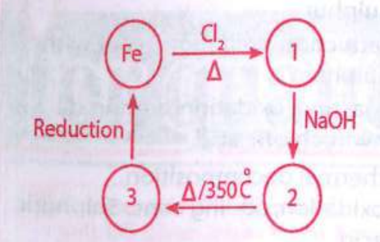
24 All the following can take place before reduction of iron ore except...........

ⓐ converting large size of ore into suitable size to be easily reduced.
ⓑ reacting with CO under high temperature .
ⓒ using the magnetic separation to decrease the percentage of impurities .
ⓓ getting rids of humidity and heating strongly in air .

25 Heating iron II oxalate in air strongly gives a solid compound (X) when concentrated hot sulphuric acid is added to compound (X) another compound (Y) will be formed in comparing the properties of compounds (X) and (Y) it is found that..........

ⓐ the compounds (X) and (Y) have equal magnetic moment and both of them are coloured.
ⓑ the compound (X) has higher magnetic moment than (Y) and one of them is coloured .
ⓒ the compounds (X) and (Y) have equal magnetic moment and both of them are colorless.
ⓓ The compound (Y) has higher magnetic moment than (X) and both of them are coloured.

26 Study the following diagram:
The three compounds 1, 2 & 3 are respectively.......



ⓐ 1- $FeCl_2$, 2- Fe_2O_3, 3-$Fe(OH)_3$
ⓑ 1- $FeCl_2$, 2- FeO, 3- $Fe(OH)_2$
ⓒ 1- $FeCl_3$, 2- Fe_2O_3, 3-$Fe(OH)_3$
ⓓ 1- $FeCl_3$, 2- $Fe(OH)_3$, 3- Fe_2O_3

27 Arrange the following steps to obtain iron III hydroxide starting with iron II oxide.........

ⓐ adding diluted acid – adding ammonium hydroxide solution .
ⓑ oxidation – adding diluted acid – adding sodium hydroxide solution.
ⓒ reduction – adding diluted acid – oxidation .
ⓓ oxidation – adding hot concentrated acid – adding ammonia solution.

28 By passing a current of hydrogen gas on the red iron oxide at 280°C then adding hot dil. hydrochloric acid to the product, ... are formed.

ⓐ iron II chloride solution, iron III chloride solution and hydrogen
ⓑ iron II chloride solution, iron III chloride solution and water
ⓒ iron II chloride solution and water
ⓓ magnetic iron oxide

29 Study the following two reactions:

$$(COO)_2Fe_{(s)} \xrightarrow{\Delta / \text{no air}} FeO_{(s)} + X + Y$$

$$Fe_3O_4 + X \xrightarrow{400:700^\circ C} Z + Y$$

-From the previous two reactions identify the substances X,Y and Z?
....

Choices	X	Y	Z
(a)	CO	CO_2	Fe
(b)	CO	CO_2	FeO
(c)	CO_2	CO	FeO
(d)	CO_2	CO	Fe

30 By adding excess amount of diluted hydrochloric acid to a mixture of the three iron oxides then dividing the produced solution into two parts and adding ammonia solution to the 1st part and caustic soda solution to the 2nd part.
So, the correct sentence from the following is ....

ⓐ reddish brown ppt. is formed in the two parts.
ⓑ reddish brown ppt. is formed in the 1st part only.
ⓒ reddish brown ppt. is formed in the 2nd part only.
ⓓ reddish brown ppt. is not formed in the two parts.

31 What's the number of moles iron II sulphide which can be obtained from 1 mole of magnetic iron oxide?

ⓐ 1 mole
ⓑ 2 mole
ⓒ 3 mole
ⓓ 4 mole

32 During metallurgy of iron, we can get rid of sulphur and phosphorous in solid state during.......... process while that in gaseous state during................ process.

ⓐ concentrating / roasting
ⓑ roasting / concentrating
ⓒ roasting / magnetic separation
ⓓ sintering / crushing

33 Passivity of iron can be removed physically by ....

ⓐ dissolving in dil. HCl.
ⓑ dissolving in conc. HCl.
ⓒ dissolving in dil. H_2SO_4.
ⓓ abrasion.

34 On oxidation of 3 moles red hot iron by water vapor, 4 moles of hydrogen evolved while on oxidation of 2 moles of chromium by water vapor, 3 moles of hydrogen evolved.
- So, oxidation number of iron and chromium in the produced oxides are..........

Choices	(a)	(b)	(c)	(d)
Iron oxide	II	III	(II), (III)	(II), (III)
Chromium oxide	II	III	II	III

35 The solid substance which is produced from reduction of Fe_2O_3 by CO at 280°C ....

ⓐ reacts with dil. H_2SO_4 to produce $FeSO_4$ and water.
ⓑ reacts with hot conc. H_2SO_4 to produce $FeSO_4$, $Fe_2(SO_4)_3$ and water vapor.
ⓒ reacts with hot conc. H_2SO_4 to produce $FeSO_4$, $Fe_2(SO_4)_3$, SO_2 and water vapor.
ⓓ reacts with hot conc. H_2SO_4 to produce $Fe_2(SO_4)_3$ and water.

36 A and B are two salts of iron, both of them is decomposed thermally giving three types of oxides. One of the produced oxides from the salt (A) is used to reduce one of the oxides produce from the salt (B) to produce the most important metal in heavy industries.
- Which of the following choices represents the salt (A) and the salt (B) respectively? ....

ⓐ Iron II carbonate /iron II sulphate.
ⓑ Iron II sulphate / iron III hydroxide.
ⓒ Iron II oxalate / iron II sulphate.
ⓓ Iron II oxalate / iron II carbonate.

37 To convert yellow ore into iron II sulphide.............. respectively.

ⓐ roasting, reduction, react with sulphur
ⓑ reduction, oxidation, react with sulphur
ⓒ roasting, oxidation, adding dil hydrochloric acid
ⓓ thermal decomposition, oxidation, adding conc. Sulphuric acid

38 Carbon dioxide is produced from the..........

ⓐ thermal decomposition of siderite
ⓑ heating iron II oxalate in absence of air.
ⓒ reduction of hematite in midrex and blast furnace.
ⓓ more than one correct.

39 Two test tubes, the first contains iron fillings and the second contains red iron oxide, conc. sulphuric acid is added to each of them followed by potassium dichromate solution, so the color of the solution becomes .... in the first tube and .... in the second solution.

ⓐ green / green
ⓑ colorless / orange
ⓒ orange / green
ⓓ green / orange

40 By heating the following iron compounds ($FeCO_3$ – Fe_3O_4 – FeO) separately and comparing the solid mass produced after heating ......
[Fe = 56, O = 16, H = 1]

ⓐ The mass of $FeCO_3$ increases and the mass of FeO decreases.
ⓑ The mass of Fe_3O_4 doesn't change and the mass of FeO increases.
ⓒ The mass of $FeCO_3$ decreases and the mass of Fe_3O_4 increases.
ⓓ The mass of $FeCO_3$ increases and the mass of Fe_3O_4 doesn't change.

Answers

No.	Answer	No.	Answer
1	D	2	D
3	B	4	D
5	B	6	B
7	A	8	B
9	A	10	B
11	A	12	B
13	B	14	A
15	D	16	D
17	A	18	B
19	A	20	D
21	D	22	B
23	C	24	B
25	A	26	D
27	D	28	D
29	B	30	D
31	C	32	A
33	D	34	D
35	B	36	C
37	A	38	D
39	D	40	C

Chapter 2

Chemical analysis





عدد خاص

40 ideas for qualitative analysis

1 The cation that doesn't precipitat as hydroxide

ⓐ Fe^{2+}.
ⓑ Ca^{2+}.
ⓒ Al^{3+}.
ⓓ Fe^{3+}.

2 two processes (A) & (B):
• (A) is Determined if the soil contain poisoningcomponentsornot
• (B) is Determined degree of air pollution by CO gas

ⓐ both A & B are quantitative analysis.
ⓑ both A & B are qualitative analysis.
ⓒ A only is qualitative analysis.
ⓓ B only is qualitative analysis.

3 Which of the following can be differentiated by heating ?

ⓐ $NaHCO_3$, $Ca(HCO_3)_2$.
ⓑ NH_4HCO_3 , $KHCO_3$.
ⓒ $Ba(HCO_3)$, $Ca(HCO_3)_2$.
ⓓ more than one correct.

4 If acid (A) is more stable than acid (B), so a gas can be obtained from reaction between

ⓐ acid (A) + acid (B).
ⓑ acid (A) + salt of acid (B) .
ⓒ salt of acid (A) + salt of acid (B) .
ⓓ salt of acid (A) + acid (B) .

5 Adding dil HCl to both of :
salt (X) gives a gas turns limewater into milky if pass for a short time only but turbidity remove if continue for a long time
salt (Y) gives a gas turns acidified potassium dichromate from orange into green
from these observations you can deduce ....

ⓐ exactly what is the anion of salt (X) .
ⓑ exactly what is the anion of salt (Y) .
ⓒ exactly what is the acid of the anion of salt (X).
ⓓ exactly what is the acid of the anion of salt (Y).

6 X + Fe ⟶ passivity effect ; by adding concentrated sulphuric acid to sodium salt of X acid ....

ⓐ a Colorless gas is evolved which forms white clouds with a glass rod wet with ammonia solution.
ⓑ an Orange vapour is evolved which turns into yellow By a paper wet with starch solution.
ⓒ a Violet iodine vapour, is evolved which turns a paper wet with starch solution into blue.
ⓓ a Reddish brown gas evolves.

7 Anion (X) from $BaCl_2$ group ....

ⓐ by adding dil. HCl to the salt NaX gives a gas.
ⓑ by adding hot conc. H_2SO_4 to the salt NaX gives a gas.
ⓒ by adding $BaCl_2$ solution to the salt NaX gives a gas.
ⓓ we can not obtain a gas from the salt NaX.

8 You can turn nitrite into nitrate by using ....

ⓐ reducing agent .
ⓑ oxidizing agent .
ⓒ dry test.
ⓓ no correct answer.

9 The fifth analytical group reagent can be used as reagent for all of the following except.....................

ⓐ Ra^{2+}.
ⓑ Ca^{2+}.
ⓒ Ba^{2+}.
ⓓ Na^{+}.

10 Cation M^{2+} from 5th analytical group , so main experiment for its detection is correctly expressed by the equation ...

ⓐ $MCl_{2(aq)} + H_2S_{(g)} \xrightarrow{\text{acidic med.}} H_2SO_{4(aq)} + MS_{(s)}$.
ⓑ $MCl_{2(aq)} + H_2SO_{4(aq)} \xrightarrow{\text{dil.}} 2HCl_{(aq)} + MSO_{4(s)}$.
ⓒ $MSO_{4(aq)} + 2NH_4OH_{(aq)} \longrightarrow (NH_4)_2SO_{4(aq)} + M(OH)_{2(s)}$.
ⓓ $MCl_{2(aq)} + (NH_4)_2CO_{3(aq)} \longrightarrow 2NH_4Cl_{(aq)} + MCO_{3(s)}$.

11 There are three acids A,B and C the boiling points of them 187°c , 87°c and 78°c ,so....

ⓐ Acid A can replace anions of B but can't replace anions of C.
ⓑ Acid A can replace anions of B and C from their salts .
ⓒ Acid B is the most stable .
ⓓ Acid C can replace anions of A and B.

12 sulphuric acid used to detect cation /anion..............

ⓐ Cu^{2+} / S^{2-}.
ⓑ Ca^{2+} / SO_4^{2-}.
ⓒ Ca^{2+} / Br^{-}.
ⓓ Al^{3+} / Cl^{-}.

13 Dilute hydrochloric acid is used in the detection of the anion and the cation .... respectively.

ⓐ carbonate and calcium
ⓑ nitrite and silver
ⓒ sulphate and mercury (I)
ⓓ phosphate and lead (II)

14 Scientific idea used in detection for cations is used to detect some anions . which anions detection depends on this scientific idea.

- ⓐ both carbonate & bicarbonate .
- ⓑ both Chloride & bromide .
- ⓒ both sulphate & phosphate .
- ⓓ both Nitrite & nitrate .

15 By adding ammonia solution to two silver precipitates the first which dosen't affect by sunlight and doesn't dissolve but the second which turns into violet by sun light which of the following may represent the anions respectively ?

- ⓐ I^-, Cl^-.
- ⓑ CO_3^{2-}, PO_4^{3-}.
- ⓒ CO_3^{2-}, SO_4^{2-}.
- ⓓ Cl^-, I^-.

16 By adding hot concentrated sulphuric acid to two solid substances (A&B) separately, in case of (A) no reaction occurs but a gas evolved and precipitate formed in case (B) , So A &B ions are ....

- ⓐ A: CO_3^{2-}, B: PO_4^{3-}.
- ⓑ A: SO_4^{2-}, B: SO_3^{2-}.
- ⓒ A: NO_2^-, B: $S_2O_3^{2-}$.
- ⓓ A: PO_4^{3-}, B: $S_2O_3^{2-}$.

17 When iron reacts with chlorine then adding NaOH solution to the product, the formed compound is ....

- ⓐ reddish brown ppt. and soluble in ammonia solution.
- ⓑ reddish brown ppt. and soluble in acids solution.
- ⓒ greenish white ppt. and soluble in ammonia solution.
- ⓓ greenish white ppt. and soluble in acids solution.

18 When the iron fillings react with sulphur then adding dil.HCl acid to the product, ...

- ⓐ irritating smell gas is evolved .
- ⓑ reddish brown gas is evolved .
- ⓒ bad smell gas is evolved .
- ⓓ no gas evolved .

19 On adding $Al(OH)_3$ ppt. in solution (X) the ppt. dissolves while on adding $Fe(OH)_3$ to same solution (X) the ppt. doesn't dissolve , so on adding drops of litmus solution to solution (X) the color will be ....

- ⓐ red.
- ⓑ purple.
- ⓒ blue.
- ⓓ green.

20 The anion which forms precipitates with (Ba^{2+}, Ag^+) is..........

- ⓐ Cl^-
- ⓑ HCO_3^-
- ⓒ NO_3^-
- ⓓ PO_4^{3-}

21 By passing hydrogen sulphide on copper II sulphate solution, the precipitate is formed when adding ....

- ⓐ NaOH solution .
- ⓑ increase pressure .
- ⓒ dil. HCl .
- ⓓ increase temperature .

22 On detecting the cation in salt (X) by using NaOH solution ppt. is formed then by adding excess of the reagent the precipitate disappear, So the salt (X) is.......

- ⓐ $Al(NO_3)_3$.
- ⓑ $FeSO_4$.
- ⓒ $FeCl_3$.
- ⓓ $CuSO_4$.

23 On adding strong concentrated mineral acid to salts (X,Y) separately, gas evolved in both cases (X) and (Y) but have different colors, so the choice which doesn't represent this observation is.............

- ⓐ (X) potassium bromide, (Y) potassium iodide .
- ⓑ (X) potassium bromide, (Y) potassium nitrate .
- ⓒ (X) potassium chloride, (Y) potassium carbonate .
- ⓓ (X) potassium iodide, (Y) potassium nitrate .

24 When copper (II) sulphate solution reacts with gas (A) in acidic medium a black ppt is formed, and when silver nitrate solution reacts with solution (B) a black ppt is formed, then (A) and (B) are ....

- ⓐ (A): CO_2, (B): NaBr.
- ⓑ (A): H_2S, (B): NaI.
- ⓒ (A): H_2S, (B): Na_2S.
- ⓓ (A): SO_2, (B): NaCl.

25 On adding diluted hydrochloric acid to salt (X), an irritating smell gas is evolved with suspension a yellow substance in a solution and on adding sodium hydroxide solution, a gelatinous white ppt. is formed which is dissolve in excess sodium hydroxide solution. So, the formula of that salt (X) is ....

- ⓐ $Al_2(SO_3)_3$.
- ⓑ $Fe_2(SO_4)_3$.
- ⓒ $Al_2(S_2O_3)_3$.
- ⓓ $FeSO_4$.

26 By adding $AgNO_3$ solution on two solutions (X) & (Y) a yellow ppt. is formed in both of them, but by adding ammonia solution in these precipitates, it disappears in (Y) solution but remains in solution (X) So, salts (X) and (Y) are

- ⓐ (X): NaI, (Y): Na_3PO_4.
- ⓑ (X): NaCl, (Y): NaBr.
- ⓒ (X): $NaNO_3$, (Y): Na_2SO_4.
- ⓓ (X): $NaNO_2$, (Y): $NaNO_3$.

27 Which of the following is used to differentiate between solid salt of sodium sulphide and sodium sulphate?

- ⓐ $AgNO_{3(s)}$.
- ⓑ $Ca(OH)_{2(s)}$.
- ⓒ $HCl_{(aq)}$.
- ⓓ $NaOH_{(aq)}$.

28 On adding conc. sulphuric acid to two salts gas (X) evolved which turns a paper wet by starch into yellow and gas (Y) evolved which turns a paper wet by starch into blue so the gases are ....

- ⓐ X: $NO_{2(g)}$, Y: $I_{2(v)}$.
- ⓑ X: $HBr_{(g)}$, Y: $HI_{(g)}$.
- ⓒ X: $HCl_{(g)}$, Y: $Br_{2(v)}$.
- ⓓ X: $Br_{2(v)}$, Y: $I_{2(v)}$.

29 (A) and (B) are solutions of potassium salts, when adding silver nitrate solution to both of them, a yellow precipitate is formed with both of them, then by adding dilute nitric acid to the precipitate of both of them, we found that the precipitate formed from (A) solution dissolves while the precipitate formed from (B) solution does not dissolve

	Anion of (A) salt	Anion of (B) salt
(a)	Bromide	Chloride
(b)	Phosphate	Iodide
(c)	Iodide	Phosphate
(d)	Phosphate	Bromide

30 When diluted HCl is added to solid salt has a chemical formula (A_2X) a gas evolves which forms with wet paper by (Y_2B) solution a black ppt. , the anion (Y) is ......

ⓐ HCO_3^-.
ⓑ S^{2-}.
ⓒ SO_3^{2-}.
ⓓ CH_3COO^-.

31 From the following equations :

$Na_2X_{(aq)} + 2AgNO_{3(aq)} \longrightarrow 2NaNO_{3(aq)} + Ag_2X_{(s)}$

$Na_2Y_{(aq)} + 2AgNO_{3(aq)} \longrightarrow 2NaNO_{3(aq)} + Ag_2Y_{(s)}$

- If you know that, Ag_2X has a black color in room temperature, while Ag_2Y has a black color after heating
- Which of the following is right for the acid of the two salts? ....

Choice	H_2X	H_2Y
(a)	H_2SO_3	$H_2S_2O_3$
(b)	H_2S	$H_2S_2O_3$
(c)	H_2SO_3	H_2S
(d)	H_2S	H_2SO_3

32 A black ppt. is formed in all the following reactions except ....

ⓐ Sodium sulphide solution with lead II acetate.
ⓑ Silver nitrate solution with potassium sulphide solution.
ⓒ Heating of silver sulphite.
ⓓ Diluted hydrochloric acid with sodium nitrite .

33 On adding acidified potassium dichromate with sulphuric acid to each of sodium nitrite and sodium nitrate, what is the color of the produced solution in each case?

Choice	Sodium nitrite	Sodium nitrate
(a)	Orange	Green
(b)	Green	Orange
(c)	Orange	Orange
(d)	Green	Green

34 (X, Y, Z) three sparingly soluble salts in water, ammonia solution was added to each of them, so the salt (X) takes 0.5 s to dissolve in ammonia solution and the salt (Z) takes 10 s while the salt (Y) doesn't dissolve. What are these salts?

Choice	X	Y	Z
(a)	AgCl	AgBr	AgI
(b)	AgBr	AgI	AgCl
(c)	AgCl	AgI	AgBr
(d)	AgI	AgBr	AgCl

35 On adding magnesium sulphate solution to salt solution (A), a white ppt. is formed after heating and on adding diluted hydrochloric acid to that solution then passing hydrogen sulphide gas, a black ppt. is formed. While on adding concentrated sulphuric acid to salt solution (B) with heating, orange fumes is evolved which change paper wet with starch to yellow and on adding ammonia solution to it, a gelatinous white ppt. is formed which is dissolve in diluted acids. So, the two salts (A) and (B) respectively are ....

ⓐ Calcium bicarbonate and aluminum iodide.
ⓑ Copper II carbonate and iron lii iodide.
ⓒ Calcium carbonate and iron II chloride.
ⓓ Copper II bicarbonate and aluminum bromide.

36 All the following solutions can form precipitate by passing carbon dioxide except......

ⓐ $Ba(OH)_2$.
ⓑ $Ca(OH)_2$.
ⓒ $Mg(OH)_2$.
ⓓ KOH.

37 To separate iron III hydroxide from a mixture of it with aluminum hydroxide, we must add...........

ⓐ excess of ammonium hydroxide solution then filtration .
ⓑ excess of ammonia solution then distillation .
ⓒ excess of sodium hydroxide solution then filtration.
ⓓ excess of caustic soda solution then distillation .

38 On dissolving 1 mole of substance X in water, an aqueous solution is formed which contains 3 moles of ions and on reacting that solution with magnesium carbonate, an acidic gas is evolved. What is the substance X? ....

ⓐ $Ca(OH)_2$.
ⓑ H_2SO_4.
ⓒ KOH.
ⓓ HNO_3.

39 If you make the following two reactions :

- Reaction (1): passing chlorine gas on red hot iron
- Reaction (2): adding a piece of iron to diluted hydrochloric acid

What would happen on adding sodium hydroxide solution to the product of the two reactions (1) and (2)? ....

ⓐ Product of reaction (1) is reddish brown ppt. while product of reaction (2) is greenish white ppt.
ⓑ Product of reaction (1) is reddish brown ppt. while product of reaction (2) is gelatinous white ppt.
ⓒ Product of reaction (1) is gelatinous white ppt. while product of reaction (2) is reddish brown ppt.
ⓓ Product of reaction (1) is greenish white ppt. while product of reaction (2) is reddish brown ppt.

40 Which of the following is used to differentiate between magnesium bicarbonate and potassium bicarbonate? ....

ⓐ by heating
ⓑ by adding water
ⓒ by adding HCl
ⓓ by adding conc. H_2SO_4

Answers

No.	Answer	No.	Answer
1	B	2	C
3	A	4	B
5	C	6	D
7	D	8	B
9	D	10	D
11	B	12	C
13	B	14	C
15	A	16	D
17	B	18	C
19	C	20	D
21	C	22	A
23	C	24	C
25	D	26	A
27	C	28	D
29	B	30	D
31	D	32	D
33	B	34	C
35	D	36	D
37	C	38	B
39	A	40	A



Chapter 2

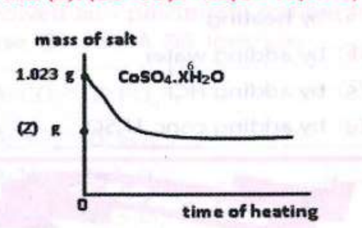
Chemical analysis

40 ideas for qualitative analysis

1 On heating 6.6g of hydrated manganese(..) chloride $MnCl_x.4H_2O$ produces 4.2 g of dehydrated salt, the oxidation state of Mn is .... (Mn=55 , Cl = 35.5 , O= 16 , H=1)

ⓐ 7+. ⓒ 3+.
ⓑ 6+. ⓓ 2+.

2 By heating hydrated salt $CoSO_4.6H_2O$ we get the results as in graph. Find (Z). (Co=59,S=32,O=16,H=1)



ⓐ 0.603 g. ⓒ 1.2 g.
ⓑ 0.3 g. ⓓ no correct answer.

3 Find no. of water of crystallization molecules in the formula of hydrated iron II chloride which lose 36.17 % of its mass by strong heating.
(Fe = 56, Cl = 35.5 , O = 16 , H= 1)

ⓐ X =2. ⓒ X = 4.
ⓑ X= 3. ⓓ X = 5.

4 By mixing 10 ml of 0.1M barium hydroxide to 10 ml of 0.1 M sulphuric acid the blue litmus...............

ⓐ turns into purple.
ⓑ turns into red.
ⓒ turns into green.
ⓓ no change (still blue).

5 Find volume of sulphuric acid H_2SO_4 with a given concentration, neutralizes with 0.5 liter NaOH solution with half concentration of the acid.

ⓐ 0.25L. ⓒ 0.5L.
ⓑ 0.125L. ⓓ 0.625L.

6 5g of NaOH was dissolved in volume (X) of water, if 20 mL of the produced solution neutralize with 10mL of 0.5M H_2SO_4 ;so the volume of added water is ....
(Na=23,O=16,H=1)

ⓐ 200 ml. ⓒ 250 ml .
ⓑ 125 ml. ⓓ 500 ml .

7 In titration process to measure concentration of HCl solution in a conical flask by using phenolphthalein indicator , when end point of reaction reached :

ⓐ solution colour change from red to colourless.
ⓑ solution colour change from colourless to red.
ⓒ solution colour change from red to blue.
ⓓ end point cannot be determined.

8 5 g. of impure potassium hydroxide is dissolved in water and the solution is completed to be 125mL,If 10mL of this solution neutralized with 15mL of 0.2 M hydrochloric acid. Calculate the percentage of KOH in the sample. [Providing that : molecular mass of KOH=56]

ⓐ 80%. ⓒ 96%.
ⓑ 54%. ⓓ 42%.

9 By precipitating all calcium ions from $CaCl_2$ solution by the main reagent of 5th group, we get 3g of white ppt. the mass of $CaCl_2$ in the original solution is ....
(Ca = 40 , Cl = 35.5 , C = 12 , O=16)

ⓐ 2.1 g ⓒ 3.56 g
ⓑ 3.33 g ⓓ 4.1 g

10 A 1.687 grams of hydrated magnesium sulphate salt ($MgSO_4.XH_2O$) was strongly heated until a constant mass of 0.824 grams the formula of hydrated salt is ....
(Mg=24,S=32,O=16,H=1)

ⓐ $MgSO_4.3H_2O$. ⓒ $MgSO_4.2H_2O$.
ⓑ $MgSO_4.7H_2O$. ⓓ $MgSO_4.5H_2O$.

11 Classify the following into volumetric or gravimetric analysis.
• X=Determine % of crystallization water in limonite
• Y=Determine % of pure $BaCl_2$ in impure sample by using K_2SO_4 solution
• Z=Determine molarity of H_3PO_4 acid by using caustic soda

ⓐ X is volumetric but Y & Z are gravimetric analysis.
ⓑ Y is volumetric but X & Z are gravimetric analysis.
ⓒ Z is volumetric but X & Y are gravimetric analysis.
ⓓ X, Y & Z are gravimetric analysis .

12 0.124 g ppt. from a substance by adding 10 mL 0.1 molar of $AgNO_3$ solution which reacted completely with solution of:
.........reacts with the 10ml of 0.1M $AgNO_3$ solution completely to form a ppt. its mass 0.124g

ⓐ NaCl. ⓒ Na_2S.
ⓑ Na_2SO_3. ⓓ Na_3PO_4.

13 Barium chloride is used to differentiate between sodium salt of both SO_4^{2-} and PO_4^{3-} anions. In one of its experiments, 1.21 gram of white ppt. of barium salt is formed; that dissolves in diluted hydrochloric acid. Identify the anion, and then calculate the mass of barium chloride that used in this experiment.
(atomic masses Ba = 137, Cl = 35.5, P = 31, S = 32, O = 16)

- ⓐ sulphate, 4.2g.
- ⓑ phosphate, 3.75g.
- ⓒ phosphate, 1.256g.
- ⓓ sulphate, 2.5 g.

14 Calculate the mass of copper ions which reacts with H_2S gas , to precipitate 3 grams of copper II sulphide ..
(Atomic masses Cu = 63.5 , S = 32)

- ⓐ 2 g.
- ⓒ 2.5g.
- ⓑ 3 g.
- ⓓ 3.5 g.

15 If 0.2 mole of anhydrous salt combines with 3.6g of water forming hydrated salt $MCl_2.XH_2O$ (where M is metal); the atomic mass of M is .... knowing that the molar mass of hydrated salt is 113g. (Cl=35.5, H=1 , O=16)

- ⓐ 137.
- ⓒ 56.
- ⓑ 40.
- ⓓ 24.

16 An impure sample of calcium carbonate, its mass is 12 g when excess of diluted hydrochloric acid was added to it, 2464 ml of CO_2 gas evolved (at STP). What is the percentage of purity of calcium carbonate in this sample? ....
[$CaCO_3$ = 100 g/mol]

- ⓐ 45.8 %.
- ⓒ 75 %.
- ⓑ 51.3 %.
- ⓓ 91.7 %.

17 Which of the following solutions is used as standard solution to determine the concentration of chloride ions in an aqueous solution by titration? ....

- ⓐ HCl.
- ⓒ NaOH.
- ⓑ NaCl.
- ⓓ $AgNO_3$.

18 If the molar mass of hydrated zinc sulphate crystals is 287.4 g , What is the number of the moles of crystallization water found in 1 mole of these crystals? ....
[Zn = 65.4 , S = 32 , O = 16 , H = 1]

- ⓐ 5 mol.
- ⓒ 7 mol.
- ⓑ 6 mol.
- ⓓ 8 mol.

19 30 mL of 0.2 M NaOH solution were added to 100 mL of 0.1 M HCl solution, and to complete the titration, a certain volume of 0.25 M KOH solution was used. What is the used volume of KOH solution? ....

- ⓐ 16 mL .
- ⓒ 35 mL .
- ⓑ 32 mL .
- ⓓ 70 mL.

20 is required to titrate 35.2 mL of 0.106 M NaOH solution till reaching end point , calculate the molar mass of this acid

- ⓐ 171 g / mol.
- ⓒ 151.28 g/mol.
- ⓑ 297.49 g /mol.
- ⓓ 165 g/mol.

21 On adding 200mL of distilled water to 0.5L of 0.1M NaOH solution, so the concentration of solution becomes.................

- ⓐ 0.714.M.
- ⓒ 7.14M.
- ⓑ 0.0714M.
- ⓓ 4.17M.

22 2g of impure barium chloride was dissolved in water and on adding excess of lead II nitrate to it, the mass of formed precipitate is 1g, so the percentage of chloride anion in the sample equals ......
(Cl=35.5, Ba=137, Pb=207)

- ⓐ 19.31%.
- ⓒ 28.3 %.
- ⓑ 46.3 %.
- ⓓ 12.77 %.

23 A sample of a mixture of sodium chloride and sodium phosphate salts its mass is 10g dissolved in water. An excess of barium chloride solution is added to it, a ppt is formed its mass = 6g so the percentage of sodium phosphate in the sample will be ....[Ba =137, Cl=35.5, Na=23, P=31, O=16]

- ⓐ 49.05%.
- ⓒ 32.7%.
- ⓑ 65.5%.
- ⓓ 16.35 %.

24 The number of molecules in 33 g of $C_2H_4F_2$ is .... molecule (C=12,H=1,F=19)

- ⓐ $6.02x10^{23}$.
- ⓒ $5.02x10^{23}$.
- ⓑ $3.01x10^{23}$.
- ⓓ $12.04x10^{23}$.

25 14.3g of hydrated sodium carbonate $Na_2CO_3.XH_2O$ is dissolved in water, then the volume of the solution is completed to 1 liter. If 25ml of this solution is neutralized by 25ml of 0.1 M of hydrochloric acid so,The percentage of water crystallization will be Given that (O=16, C=12, Na=23)

- ⓐ 25.87%.
- ⓒ 62.93%.
- ⓑ 15.73%.
- ⓓ 31.65%.

26 A titration process is carried out by using 20 ml of NaOH solution 0.1M , with HCl solution its concentration 0.1M , if hydrochloric acid is substituted by sulphuric acid its concentration 0.1M , the volume of the used sulphuric acid will be ....

- ⓐ double the volume of HCl.
- ⓑ half the volume of HCl.
- ⓒ equal the volume of HCl .
- ⓓ double the volume of the alkali NaOH.

27 By dissolving 3.4g of impure potassium chloride in water, then adding excess of silver nitrate to it a 6.7g of silver chloride is precipitated. Percentage of chlorine in this sample is ....
[K=39, Cl=35.5, Ag=108] .

- ⓐ 24.5%.
- ⓒ 48.7%.
- ⓑ 46.7%.
- ⓓ 94.1%.

28 On titration NaOH solution with dil. sulphuric acid if the two solutions have the same concentration so the used acid will be ......

- ⓐ equal the volume of base.
- ⓑ half the volume of base.
- ⓒ double the volume of base .
- ⓓ 4 times the volume of base.

29 What is the number of potassium hydroxide molecules which is required to neutralize with 25 mL of 0.1 M sulphuric acid? .... molecules.

- ⓐ 2.1×10^{24}
- ⓒ 1.01×10^{21}
- ⓑ 4.2×10^{24}
- ⓓ 3.01×10^{21}

30. The volume of 0.4 mol/L potassium hydroxide solution which is required to titrate 200 mL of 19.6 g/L sulphuric acid solution is .... mL.

(a) 100. (c) 300.
(b) 200. (d) 400.

31. 14.3 g of hydrated sodium carbonate ($Na_2CO_3.XH_2O$) on adding hydrochloric acid to this sample produces 1.12L of CO_2 at STP , so number of moles of water of crystallization is ....

(a) 10 mole. (c) 0.5 mole.
(b) 1 mole. (d) 5 mole.

32. 2.66 g of hydrated cobalt II sulphate ($CoSO_4.7H_2O$) is heated , the mass of lost water from the sample will be ....(Co=59,S=32,O=16,H=1)

(a) 1.467 g (c) 0.77 g
(b) 1.193 g (d) 0.1193 g

33. during a titration reaction if the number of moles of acid equal half number of moles of base so.........

(a) $n_a = n_b$. (c) $n_a = 2n_b$.
(b) $2n_a = n_b$. (d) $n_a = 3n_b$.

34. The percentage of water in hydrated iron II chloride ($FeCl_2.4H_2O$) is .... (Fe=56,Cl=35.5,O=16,H=1).

(a) 36.18 % (c) 39.34 %
(b) 93.34 % (d) 64.86 %

35. If 8 g of impure caustic soda is neutralized with 1M hydrochloric acid , what's the volume of acid ? (knowing that the percentage of caustic soda was 50%) (Na=23,O16,H=1)

(a) 10 ml. (c) 0.1 ml.
(b) 100 ml. (d) 0.01 ml.

36. A burette contains 0.3 M hydrochloric acid solution, if its reading was 10 ml before the experiment so, its final reading after titrating with 21 mL of 0.1 M sodium hydroxide solution becomes .... ml.

(a) 14 (c) 7
(b) 17 (d) 3

37. 1.437 g of a sample of $ZnSO_4.XH_2O$ is dissolved in water then adding barium chloride to precipitate 1.165 g of barium sulphate. What is the molecular formula of hydrated zinc sulphate? …….. [Zn = 65.4, Ba = 137.3 , S = 32 , O = 16].

(a) $ZnSO_4.5H_2O$ (c) $ZnSO_4.7H_2O$
(b) $ZnSO_4.6H_2O$ (d) $ZnSO_4.8H_2O$

38. Dibasic acid was titrated by sodium hydroxide so, the suitable titration law is ....

(a) $M_a \times V_a = M_b \times V_b$.
(b) $2M_a \times V_b = M_b \times V_a$.
(c) $2M_a \times V_a = M_b \times V_b$.
(d) $M_a \times V_a = 2M_b \times Vb$.

39. 1.5 g of a mixture of calcium nitrite and sodium sulphate was titrated by 15 mL of 0.6 M hydrochloric acid. So, the percentage of sodium sulphate in that mixture is …….. [Ca = 40 , N = 14 , O = 16].

(a) 80 % (c) 39.6 %
(b) 40 % (d) 60.4 %

40. A sample of impure lime stone its mass 2.5 g was heated strongly until a constant mass of 1.62 g, what is the percentage of lime stone in the sample (exposing no reaction through impurities)? ....
[Ca = 40 , C = 12 , O = 16]

$$CaCO_{3(s)} \xrightarrow{\Delta} CaO_{(s)} + CO_{2(g)}$$

(a) 64.8 % (c) 80 %
(b) 35.2 % (d) 20 %



No.	Answer	No.	Answer
1	D	2	A
3	C	4	D
5	B	6	C
7	D	8	D
9	B	10	B
11	C	12	C
13	C	14	A
15	D	16	D
17	D	18	C
19	A	20	B
21	B	22	D
23	C	24	B
25	C	26	B
27	C	28	B
29	D	30	C
31	A	32	B
33	B	34	A
35	B	36	B
37	C	38	C
39	D	40	C

Chapter 3

Chemical equilibrium




40 ideas for Equilibrium System – Reaction Rate

1 $HCN + H_2O \rightleftharpoons H_3O^+ + CN^-$ To increase the number of unionized HCN molecules........

ⓐ add catalyst.
ⓑ add HCl solution.
ⓒ add NaOH solution .
ⓓ all the previous.

2 The solution of pure acetic acid in water ....

ⓐ contains ions and illuminate the lamp which is connected to two poles dipped in the solution .
ⓑ does not contain ions and does not illuminate the lamp .
ⓒ contains ions that increase in number on dilution with water .
ⓓ more than one correct .

3 Equilibrium constant:

$$K_p = \frac{P(H_2O))}{P(H_2)}$$

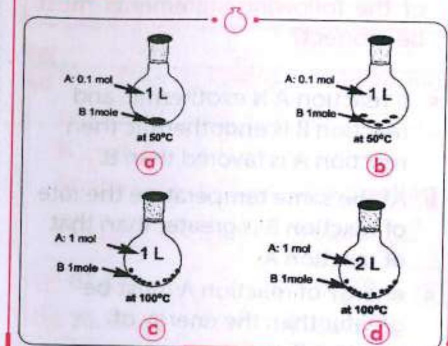
refers to balanced equation ... ...

ⓐ $Cu_{(s)} + H_2O_{(v)} \rightleftharpoons CuO_{(s)} + H_{2(g)}$.
ⓑ $CuO_{(s)} + H_{2(g)} \rightleftharpoons Cu_{(s)} + H_2O_{(l)}$.
ⓒ $H_{2(g)} \rightleftharpoons H_2O_{(v)}$.
ⓓ $CuO_{(s)} + H_{2(g)} \rightleftharpoons Cu_{(s)} + H_2O_{(v)}$.

4 In which of the following reactions an increase in the volume of the reaction vessel favor formation of the products?

ⓐ $PCl_{5(g)} \rightleftharpoons PCl_{3(g)} + Cl_{2(g)}$.
ⓑ $N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}$.
ⓒ $H_{2(g)} + I_{2(g)} \rightleftharpoons 2HI_{(g)}$.
ⓓ $N_{2(g)} + O_{2(g)} \rightleftharpoons 2NO_{(g)}$.

5 According to the following reaction which one of them take shorter time?



6 An equilibrium mixture, in a 1500mL container, involving the chemical system

$$X_{2(g)} + Y_{2(g)} \rightleftharpoons 2XY_{(g)}$$

is found to contain ,$[X_2]$ =0.1mol/L ,$[Y_2]$ =0.1 mol/L , equilibrium constant is 0.01 the mass of XY in the container at equilibrium is.............. (molar mass of XY = 40 g/mol).

ⓐ 0.6 g
ⓑ 0.4 g
ⓒ 0.01 g
ⓓ 0.9 g

7 Nitrogen dioxide decomposes on heating according to the following equation:

$$2NO_{2(g)} \rightleftharpoons 2NO_{(g)} + O_{2(g)}$$

When 6.80 moles of $NO_{2(g)}$ were put in a 1.00 L container and heated, the equilibrium mixture contained 1.2 moles of $O_{2(g)}$. What is the equilibrium constant Kc for the reaction?

ⓐ 0.353 .
ⓑ 0.655 .
ⓒ 1.53 .
ⓓ 2.80 .

8 The following reaction has two equilibrium constant values at two different temperatures:

$A_{2(g)} + B_{2(g)} \rightleftharpoons 2AB_{(g)}$ $K_c = 50$ at 448°C

$A_{2(g)} + B_{2(g)} \rightleftharpoons 2AB_{(g)}$ $K_c = 67$ at 850°C

The concentration of B_2 can be decreased by..........

ⓐ adding AB .
ⓑ removing A_2.
ⓒ heating .
ⓓ cooling .

9 If the reaction is exothermic by raising temperature ....

ⓐ the number of activated molecules increase .
ⓑ rate of reaction increases .
ⓒ the activation energy increase .
ⓓ a & b are correct .

10 Consider the following equilibrium:

$$4HCl_{(g)} + O_{2(g)} - \text{energy} \rightleftharpoons 2H_2O_{(g)} + 2Cl_{2(g)}$$

The temperature of the equilibrium system is increased and a new equilibrium is established. Which of the following describes the rates of the forward and reverse reactions as a new equilibrium is being established?

Choice	Forward rate	Reverse rate
(a)	Increased	Increased
(b)	Decreased	Not changed
(c)	Decreased	Increased
(d)	Not changed	Increased

11 According to the reaction:
$X_{2(g)} + 2Y_{(g)} \rightleftharpoons 2XY_{(g)}$, $\Delta H = +102$
all the following increase the concentration of X_2 except ......

- ⓐ increase concentration of XY.
- ⓑ increase pressure .
- ⓒ cooling.
- ⓓ add something absorb Y .

12 In the following reaction:
$2NO_{(g)} + Cl_{2(g)} \rightleftharpoons 2NOCl_{(g)}$, $H = -38$ kJ
If you know that, activation energy for the forward direction in the previous reaction is 62 kJ so, the activation energy for the backward reaction = ...

- ⓐ 24 kJ
- ⓑ 38 kJ
- ⓒ 62 kJ
- ⓓ 100 kJ

13 If activation energy of an exothermic reaction is decreased by 20 kJ by the effect of a catalyst to become 150 kJ and the activation energy of the backward reaction without using a catalyst is 220 kJ so, the value of Δ H equals ...... .kJ.

- ⓐ – 50
- ⓑ – 200
- ⓒ + 50
- ⓓ + 200

14 If the value of K_p is 0.5 and the partial pressure of A= 2 atm , B= 3atm ,
$A_{(g)} + B_{(g)} \rightleftharpoons C_{(g)}$, the total pressure will be.......................atm.

- ⓐ 10
- ⓑ 8
- ⓒ 5
- ⓓ 12

15 By adding sodium sulphate to the following reaction:
$A^{2+} + SO_4^{2-} \rightleftharpoons Y^{2-} + 4H_2O$
red green

- ⓐ Increasing the intensity of green colour.
- ⓑ The colour of a solution become red.
- ⓒ Increasing the value of equilibrium constant.
- ⓓ The colour of the solution doesn't change.

16 For the following reaction:
$H_{2(g)} + Cl_{2(g)} \rightleftharpoons 2HCl_{(g)}$
If (Kc = 54.8) at 425 °C, what is the value of KC for the hydrogen chloride dissociation reaction at the same temperature?

- ⓐ 1/54.8
- ⓑ $1/\sqrt{54.8}$
- ⓒ 54.8
- ⓓ 27.4

17 If reaction A has activation energy of 250kj and reaction B has an activation energy of 100kj, which of the following statements must be correct?

- ⓐ If reaction A is exothermic and reaction B is endothermic then reaction A is favored than B.
- ⓑ At the same temperature the rate of reaction B is greater than that of reaction A.
- ⓒ energy of reaction A must be greater than the energy of reaction B.
- ⓓ rate of reaction A at 25° equals rate of reaction B at 100°.

18 The value of (K_p) decreased for an exothermic gaseous reaction at equilibrium state on ....

- ⓐ Increasing the partial pressure of one of reactants .
- ⓑ Increasing the partial pressure of one of products .
- ⓒ Raising the temperate .
- ⓓ Dropping the temperature .

19 In the equilibrium if K_c = 0.1 so, ...

- ⓐ $K_1 = K_2$
- ⓑ $K_1 < K_2$
- ⓒ $r_1 > r_2$
- ⓓ more than one correct .

20 In the following equilibrium:
$2NO_{(g)} + O_{2(g)} \rightleftharpoons 2NO_{2(g)}$
If $[NO] = [NO_2]$ so, ...

- ⓐ $r_1 = K_1 [O_2]$.
- ⓑ $r_2 = K_2 [O_2]^{-1}$.
- ⓒ $K_c = [O_2]$.
- ⓓ $K_c = [O_2]^{-1}$.

21 In the following equilibrium reaction: $H_{2(g)} + I_{2(g)} \rightleftharpoons 2HI_{(g)}$ - heat
The value of Kc increases by ... ...

- ⓐ decreasing the temperature .
- ⓑ increasing the concentration of H_2 gas .
- ⓒ decreasing the concentration of H_2 gas .
- ⓓ increasing the temperature .

22 If the equilibrium constant for the reaction is
$H_{2(g)} + Cl_{2(g)} \rightleftharpoons 2HCl_{(g)}$, $K_c = 4.4x10^{32}$
So the Kc value in this reaction
$½ H_{2(g)} + ½ Cl_{(g)} \rightleftharpoons HCl_{(g)}$ will be ... .

- ⓐ $2.2x10^{32}$
- ⓑ $4.4x10^{32}$
- ⓒ $2.1x10^{16}$
- ⓓ $1.1x10^{16}$

23 Which of the following is complete reaction?

- ⓐ $CH_3COOH_{(l)} + H_2O_{(l)} = CH_3COO^-_{(aq)} + H_3O^+_{(aq)}$.
- ⓑ $HCOOH_{(aq)} + CH_3OH_{(aq)} = HCOOCH_{3(aq)} + H_2O_{(l)}$.
- ⓒ $NaOH_{(aq)} + HCl_{(aq)} = NaCl_{(aq)} + H_2O_{(l)}$.
- ⓓ $NH_{3(g)} + H_2O_{(l)} = NH_4^+{}_{(aq)} + OH^-_{(aq)}$.

24 The following equation represents a system at equilibrium state
$AgCl \rightleftharpoons Ag^+_{(aq)} + Cl^-_{(aq)}$
Which of the following changes takes place by adding drops of lead II acetate to that system............

ⓐ the rate of backward reaction increases and concentration of silver ions increases .
ⓑ the rate of backward reaction decreases and concentration of silver ion decreases .
ⓒ the rate of forward reaction increases and concentration of chloride ion decreases .
ⓓ the rate of forward reaction decreases and concentration of chloride ions increases .

25 Which of the following statements describes chemical reaction at equilibrium state..........

ⓐ rate of forward reaction is always higher than that backward reaction .
ⓑ concentration of reactants and products are always constant .
ⓒ the reaction is always static not dynamic .
ⓓ concentration of reactants and products are always equal .

26 On performing a reaction of active metal (X) with strong mineral acid (Y), What is the modification which can be performed to make the reaction occurs in a shorter time?

ⓐ increasing the pressure .
ⓑ decreasing the acid volume .
ⓒ decreasing the reaction temperature .
ⓓ dividing the metal .

27 In the following reaction:
$N_2O_{4(g)(Colorless)} \rightleftharpoons 2NO_{2(g)(Reddish\ brown)}$,
On adding excess of N_2O_4.................

ⓐ the color increase and K_c value increases .
ⓑ the color increases and K_c value remains constant .
ⓒ the color decreases and K_c value remains constant .
ⓓ the color decreases and K_c value decreases .

28 In the following equilibrium reaction : $PCl_{3(g)} + Cl_{2(g)} \rightleftharpoons PCl_{5(g)}$
$K_{p1} = 0.013$
So the value of K_{p2} for this reaction :
$PCl_{5(g)} \rightleftharpoons PCl_{3(g)} + Cl_{2(g)}$ equals ......

ⓐ 67.29
ⓑ 76.92
ⓒ 61.79
ⓓ 82.6

29 In the following reaction:
$I_{2(g)} + H_{2(g)} \rightleftharpoons 2HI_{(g)}$
If the equilibrium constant of this reaction equals 1.55 and concentration of hydrogen iodide is 1.035M so the concentration of hydrogen and iodide respectively equals

ⓐ $[H_2] = 0.79M, [I_2] = 0.83M$.
ⓑ $[H_2] = 0.83M, [I_2] = 0.79M$.
ⓒ $[H_2] = 0.83M, [I_2] = 0.83M$.
ⓓ $[H_2] = 0.135M, [I_2] = 0.135M$.

30 In the following reaction:
$H_2N\text{-}NH_{2(g)} \rightleftharpoons N_{2(g)} + 2H_{2(g)}$, $\Delta H = (-)$
Hydrogen of gas amount could be increased by:

ⓐ raising the temperature .
ⓑ increasing the volume of the container .
ⓒ increasing more of N_2 to the reaction medium .
ⓓ adding catalyst to the reaction medium .

31 In hypothetical reaction
$2A_{(g)} \rightleftharpoons B_{(g)}$,$K_p=1$, So the partial pressure of (A) =

ⓐ $\sqrt{P_B}$
ⓑ P_B
ⓒ $\frac{P_B}{2}$
ⓓ $\frac{1}{\sqrt{P_B}}$

32 In the following reaction:
$H_{2(g)} + I_{2(V)} \rightleftharpoons 2HI_{(g)}$
The equilibrium can be recognized ....

ⓐ by decreasing the violet color till being constant .
ⓑ by increasing the violet color till being constant .
ⓒ when ΔH becomes constant .
ⓓ when the color of HI becomes constant .

33 Which of the following reactions is faster? ....

Choice	Change in concentration of reactants (mol. L^{-1})	Time (sec.)
(a)	2.5	100
(b)	3	90
(c)	4.8	120
(d)	2	80

34 In the following equation:
$N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}$.
if you know that energy of reactants =150 Kj, energy of products=60 Kj and activation energy of forward reaction =10 Kj so all the following are correct except......

ⓐ activation energy of backward reaction =100Kj .
ⓑ on adding compound reacts with $NH_{3(g)}$ the reaction will shifts forward .
ⓒ ΔH for the reaction = - 90Kj .
ⓓ the catalyst decreases the value of ΔH .

35 Complete the following reaction (without balance) :

$H_{2(g)} + N_{2(g)} + O_{2(g)} \rightleftharpoons$ ....+.........

Activated molecules — Inactivated molecule

ⓐ $NH_{3(g)} + NO_{(g)}$

ⓑ $NH_{3(g)} + NO_{2(g)}$

ⓒ $H_{2(g)} + NO_{2(g)}$

ⓓ $NH_{3(g)} + O_{2(g)}$

36 Hydrated cobalt II chloride (pale pink) Was used as a secret ink – doesn't appear on the white paper on writing with it = according to the following equilibrium :

$CoCl_2.6H_2O_{(s)} \rightleftharpoons CoCl_{2(s)} + 6H_2O_{(v)}$

(pale pink) — (dark blue)

- So, an intelligence message can be read when it put in .... room.

ⓐ dry warm

ⓑ dry cold

ⓒ moist warm

ⓓ moist cold

37 In the following equilibrium reaction:

$N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}\ ;\ K_c = 200$

- Calculate the volume of reaction container, if you know that :

$[H_2] = 0.2$ M, $[NH_3] = 0.4$ M and no. of nitrogen gas moles = 0.2 mole

ⓐ 1 L　ⓒ 2 L

ⓑ 1.5 L　ⓓ 2.5 L

38 From the following reactions ......

$Cu_{(s)} + 2Ag^+_{(aq)} \rightleftharpoons Cu^{2+}_{(aq)} + 2Ag_{(s)}$, $Kc = 2 \times 10^{15}$

- Which of the following sentences is right? ....

ⓐ concentration of copper ions is very small .

ⓑ mass of copper metal is big .

ⓒ reaction proceeds well in the direction of consumption of silver metal .

ⓓ reaction proceeds well in the direction of consumption of silver ions .

39 In the following equilibrium reaction: $A_{(g)} \rightleftharpoons B_{(g)}\ ;\ K_c = 2.5$

If A is put in a closed container with initial concentration of A is 1M so the concentrations of A and B at equilibrium are...........

ⓐ [A] = 1M , [B] = 2.5M .

ⓑ [A] = 2.5M , [B] = 1M .

ⓒ [A] = 0.714M , [B] = 0.286M .

ⓓ [A] = 0.286M , [B] = 0.714M .

40 From the following reaction :

$P_{4(v)} + 5O_{2(g)} \rightleftharpoons P_4O_{10(s)}$

- What is the value of the rate of backward reaction? ....

ⓐ $r_1 = K_1 \times [P_4][O_2]^5$.

ⓑ $r_2 = K_2 \times [P_4O_{10}]$.

ⓒ $r_2 = K_2$.

ⓓ $r_1 = K_1$

Answers

No.	Answer	No.	Answer
1	B	2	D
3	D	4	A
5	C	6	A
7	A	8	C
9	D	10	C
11	B	12	D
13	A	14	B
15	A	16	A
17	B	18	C
19	B	20	D
21	D	22	C
23	C	24	C
25	B	26	D
27	B	28	B
29	C	30	B
31	A	32	A
33	C	34	D
35	D	36	A
37	C	38	D
39	D	40	C









عدد خاص

40 ideas for ionic equilibrium

1 One liter of saturated silver chloride solution contains 0.00192 g of dissolved AgCl at 25°C. Calculate K_{sp} for AgCl. (Ag=108, Cl=35.5)

ⓐ 7.91×10^{-10}.
ⓑ 1.79×10^{-10}.
ⓒ 8.12×10^{-10}.
ⓓ 6.55×10^{-10}.

2 By dissolving 1 g of impure NaOH in one liter of water, the P^H value of resulted solution is 12 so the % of NaOH is....................
[Na = 23 , O = 16 , H = 1]

ⓐ 20 % ⓒ 60 %
ⓑ 40 % ⓓ 80 %

3 What is the P^H of a saturated solution of $Cu(OH)_2$?
(K_{sp}= 2.6x10^{-19})

ⓐ 6.1 ⓒ 8.4
ⓑ 7.3 ⓓ 7.9

4 Lowest electric conductivity of acetic acid solution contain ...
[C=12, O=16, H=1] .

ⓐ 1g of acid in 250 mL
ⓑ 0.2 mole of acid in1/2 liter
ⓒ 2g of acid in 500 ml
ⓓ 0.25 mole of acid in 1 liter

5 P^H of HCN solution (0.001 M) as $K_a = 8.5 \times 10^{-5}$.

ⓐ zero ⓒ 10.5
ⓑ 14 ⓓ 3.5

6 When Na_2CO_3 dissolved in water, select the best answer:

ⓐ Na^+ ion affecting on ionization of water .
ⓑ CO_3^{2-} ion affecting on ionization of water.
ⓒ a & b are correct.
ⓓ no correct answer .

7 .... salt changes color of bromothymol blue into yellow.

ⓐ Sodium acetate
ⓑ Ammonium acetate
ⓒ Sodium sulphate
ⓓ Ammonium sulphate

8 If the p^H value of a given soil equals 8.5, then which of the following substances is added to neutralize the soil?

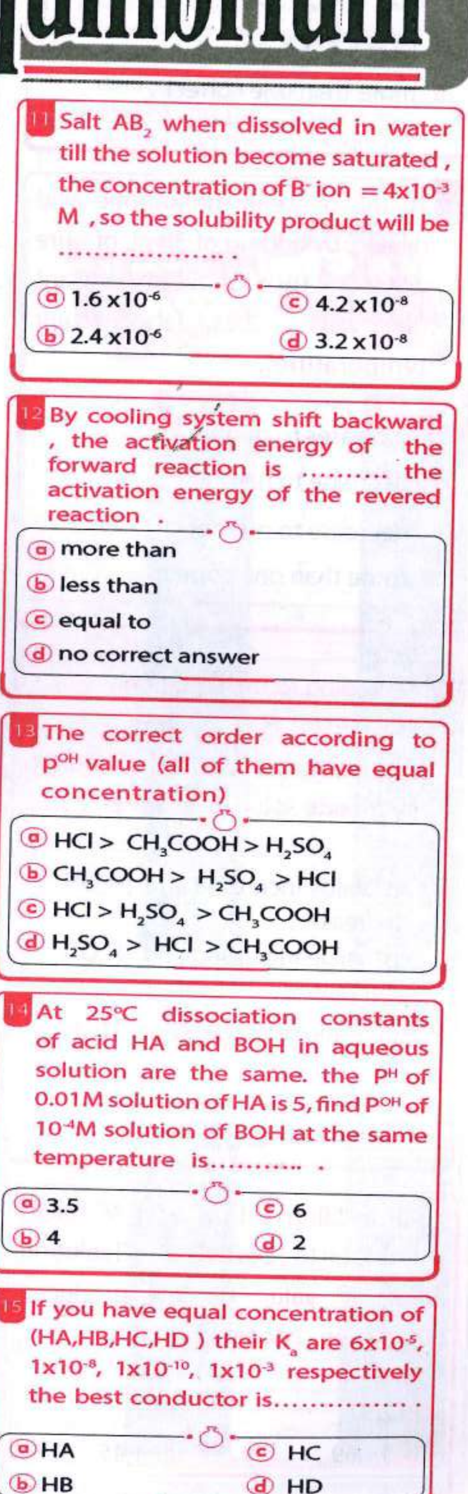
ⓐ sodium chloride
ⓑ water
ⓒ Calcium hydroxide
ⓓ Ammonium nitrate

9 If 0.196 grams of H_2SO_4 (molar mass = 98 g/mole) are placed in 2 liter of distilled water at 25ºC, What will the pH of the solution be?

ⓐ 3 ⓒ 2.7
ⓑ 11 ⓓ 11.3

10 the p^H for $Ba(OH)_2$ equal 10 so the concentration of base in solution equals .... molar .

ⓐ 10^{-4} ⓒ 10^{-10}
ⓑ 5×10^{-5} ⓓ 5×10^{-11}



11 Salt AB_2 when dissolved in water till the solution become saturated , the concentration of B^- ion = 4×10^{-3} M , so the solubility product will be ....

ⓐ 1.6×10^{-6} ⓒ 4.2×10^{-8}
ⓑ 2.4×10^{-6} ⓓ 3.2×10^{-8}

12 By cooling system shift backward , the activation energy of the forward reaction is .... the activation energy of the revered reaction .

ⓐ more than
ⓑ less than
ⓒ equal to
ⓓ no correct answer

13 The correct order according to p^{OH} value (all of them have equal concentration)

ⓐ HCl > CH_3COOH > H_2SO_4
ⓑ CH_3COOH > H_2SO_4 > HCl
ⓒ HCl > H_2SO_4 > CH_3COOH
ⓓ H_2SO_4 > HCl > CH_3COOH

14 At 25ºC dissociation constants of acid HA and BOH in aqueous solution are the same. the P^H of 0.01M solution of HA is 5, find P^{OH} of 10^{-4}M solution of BOH at the same temperature is........... .

ⓐ 3.5 ⓒ 6
ⓑ 4 ⓓ 2

15 If you have equal concentration of (HA,HB,HC,HD) their K_a are 6×10^{-5}, 1×10^{-8}, 1×10^{-10}, 1×10^{-3} respectively the best conductor is............... .

ⓐ HA ⓒ HC
ⓑ HB ⓓ HD

16 Four ions : NH_4^+, Na^+ , CO_3^{2-} , SO_4^{2-} law of mass action can be applied on solution of salt formed by combination between

ⓐ Na^+ & SO_4^{2-} .
ⓑ Na^+ & CO_3^{2-} .
ⓒ NH_4^+ & CO_3^{2-} .
ⓓ more than one correct .

17 10 mL of weak monoprotic acid diluted by adding of 30mL of pure water to it then ionization constant (Ka) will .... (at constant temperature).

ⓐ increases to double
ⓑ decrease to half
ⓒ decrease to quarter
ⓓ more than one correct

18 According to the equation :
$2H_2O_{(l)} \rightleftharpoons H_3O^+_{(aq.)} + OH^-_{(aq.)}$
On adding some drops of sodium hydroxide solution to water, ...

ⓐ p^H value increased and $[H_3O^+]$ increased.
ⓑ p^H value increased and $[H_3O^+]$ decreased.
ⓒ p^H value decreased and $[H_3O^+]$ increased.
ⓓ p^H value decreased and $[H_3O^+]$ decreased.

19 On adding 1 L of 0.04 M NaOH solution to 1L of 0.03 M HCl solution so, p^H value for the produced solution becomes ....

ⓐ 2.31 ⓒ 7
ⓑ 11.69 ⓓ 1.45

20 If the dissociation degree of monoprotic weak acid is 2.5% in a solution its concentration equals 0.01 M so, its p^{OH} value equals ....

ⓐ 3.6 ⓒ 1.6
ⓑ 10.4 ⓓ 12.4

21 On dissolving 7.258gm of HCN (K_a=7.2x10^{-10}) in water the solution became 100mL, so the degree of ionization of this acid equals .... (H=1, C=12, N=14) .

ⓐ 2.56x10^{-4}
ⓑ 1.63 x10^{-3}
ⓒ 2.56x10^{-6}
ⓓ 1.63x10^{-5}

22 The aqueous solution of potassium acetate is distinguished from the aqueous solution of ammonium acetate which has the same volume and concentration by ....

ⓐ P^{OH} value of ammonium acetate is lower .
ⓑ $[OH^-]$ value in case of potassium acetate is lower .
ⓒ $[H_3O^+]$ value in case of potassium acetate solution is lower .
ⓓ P^H value in case of potassium acetate is lower .

23 If the P^H value of an aqueous solution is 3.7, so the concentration of hydroxide ion $[OH^-]$ for that solution is .... M .

ⓐ 7.3
ⓑ 5.01 X 10^{-11}
ⓒ 10.3
ⓓ 1.99 X 10^{-4}

24 In the following equilibrium system :
$CH_3COOH_{(l)} + H_2O_{(l)} \rightleftharpoons CH_3COO^-_{(aq)} + H_3O^+_{(aq)}$
,(ka=1.8x10^{-5}) On adding drops of $HCl_{(aq)}$ to the reaction, the value of ka of acetic acid equals: .

ⓐ 1.8×10^{-5} ⓒ 3.6×10^{-6}
ⓑ 0.9×10^{-5} ⓓ 3.6×10^{-4}

25 In the following saturated solution:
$AgCl_{(s)} \rightleftharpoons Ag^+_{(aq)} + Cl^-_{(aq)}$
All of the following decrease the solubility of AgCl when they are added to it except: .

ⓐ $NH_4OH_{(aq)}$ ⓒ $NaCl_{(aq)}$
ⓑ $AgNO_{3(aq)}$ ⓓ $HCl_{(aq)}$

26 by dilution weak electrolyte at constant temperature.....

ⓐ degree of ionization decreased , concentration of solution increased .
ⓑ degree of ionization increased, concentration of solution increased .
ⓒ degree of ionization increased, concentration of solution decreased .
ⓓ degree of ionization decreased, concentration of solution decreased .

27 On adding blue litmus paper to potassium nitrate so the indicator will be: .

ⓐ blue ⓒ red
ⓑ violet ⓓ green

28 The concentration of calcium ion is .... in a calcium phosphate, $Ca_3(PO_4)_2$,in pure water, K_{sp}= 2.1x10^{-33}.

ⓐ 3.42x10^{-7} ⓒ 3.86x10^{-8}
ⓑ 6.17x10^{-5} ⓓ 4.35x10^{-6}

29 Solubility degree of lead II chloride in its saturated solution at a certain temperature equals …….

ⓐ half the concentration of the cations of lead .
ⓑ half the concentration of the anions of chloride .
ⓒ double the concentration of the cations of lead .
ⓓ double the concentration of the anions of chlroide .

30 A sparingly soluble mono-hydroxide base its $P^H = 8$ so K_{sp} = .

ⓐ 10^{-12}
ⓑ 10^{-10}
ⓒ 10^{-8}
ⓓ 10^{-6}

31 On passing …….. gas in distilled water, p^H value decreased.

ⓐ H_2
ⓑ CO_2
ⓒ NH_3
ⓓ O_2

32 What is the suitable method to express the equilibrium constant of the following reversible reaction ? ………….

$$Ca_3(PO_4)_{2(s)} \rightleftharpoons 3Ca^{2+}_{(aq)} + 2PO^{3-}_{4(aq)}$$

ⓐ K_w
ⓑ K_{sp}
ⓒ K_c
ⓓ K_p

33 Which of the following bases can't form basic salt .

ⓐ NH_4OH
ⓑ NaOH
ⓒ $Ba(OH)_2$
ⓓ $Ca(OH)_2$

34 The concentration of hydronium is more than $\sqrt{K_w}$ in solution of ………….

ⓐ NH_4Cl
ⓑ KNO_3
ⓒ Na_2CO_3
ⓓ K_2SO_4

35 If the concentration of bismuth ions in the following reaction is 2.8×10^{-4} M

$$Bi_2S_{3(s)} \rightleftharpoons 2Bi^{3+}_{(aq)} + 3S^{2-}_{(aq)}$$

So, the solubility product of bismuth sulphide equals ……..

ⓐ 1.72×10^{-18}
ⓑ 4.7×10^{-7}
ⓒ 1.86×10^{-16}
ⓓ 5.8×10^{-18}

36 if you know that the ionization of water is endothermic , by raising temperature of pure water ………….

ⓐ Ionic product of water increase, P^H value decreases and water still neutral .
ⓑ Ionic product of water doesn't change , P^H value decreases and water becomes acidic .
ⓒ Ionic product of water doesn't change, P^H value decreases and water still neutral .
ⓓ Ionic product of water increase, P^H value decreases and water becomes acidic .

37 On adding a drop of phenolphthalein to ……… solution, the solution becomes red.

ⓐ sodium chloride
ⓑ sodium carbonate
ⓒ ammonium acetate
ⓓ ammonium chloride

38 What is the mass of hydrated strontium hydroxide $Sr(OH)_2.8H_2O$ (its molar mass = 265.6 g/mol.) exists in 250 mL of its strong solution in which the concentration of hydroxide ion $[OH^-]$ = 0.1 M? ……..

ⓐ 3.32 g
ⓑ 6.64 g
ⓒ 9.97 g
ⓓ 13.3 g

39 The scientist (Van't Hoff) deduced that, raising the temperature of some chemical reactions by 10 °C increased the rate of reaction to the double.

Temperature (°C)	50	60	80
Reaction rate (M/min.)	0.50		X

So, the rate of reaction (X) at 80°C equals ……..

ⓐ 1.50
ⓑ 2.00
ⓒ 3.00
ⓓ 4.00

40 In the following equilibrium reaction:

$$SO_{3(g)} + Heat \rightleftharpoons SO_{2(g)} + \frac{1}{2} O_{2(g)}$$

- The decomposition of sulphur trioxide gas can be increased by ……

ⓐ increasing the pressure and increasing the temperature .
ⓑ decreasing the pressure and increasing the temperature .
ⓒ increasing the pressure and decreasing the temperature .
ⓓ decreasing the pressure and decreasing the temperature .



No.	Answer	No.	Answer
1	B	2	B
3	D	4	B
5	D	6	B
7	D	8	D
9	C	10	B
11	D	12	A
13	D	14	C
15	D	16	D
17	D	18	B
19	B	20	B
21	D	22	C
23	B	24	A
25	A	26	C
27	A	28	A
29	B	30	A
31	B	32	B
33	A	34	A
35	D	36	A
37	B	38	A
39	D	40	B



Chapter 4

Electrochemistry

40 ideas for galvanic cells

1 Galvanic cell is formed from (A&B) if you know that A can be used as container to keep solution of B which of the following is correct ? (knowing that the electrolyte is KNO_3)

ⓐ nitrate ions move towards electrode A.
ⓑ nitrate ions move towards electrode B.
ⓒ electrons move towards electrode B.
ⓓ potassium ions move towards electrode B.

2 Based on the following information
I only A, B and C react with 1M HCl to give $H_{2(g)}$
II when C is added to solution of the other metal ions, metallic B and D are formed
III metal C does not reduce A
The correct arrangement of four metals A, B, C and D according to strength of reducing agents is........

ⓐ C > A > B >D.
ⓑ C > A > D >B.
ⓒ A > C > D >B.
ⓓ A> C > B >D .

3 In Daniel cell, by dipping a plate of the same material of anode cell into the cathode cell, so emf value will ......

ⓐ remain the same.
ⓑ increase.
ⓒ decrease.
ⓓ get a little bit higher.

4 A,B & C three elements, reduction potential of A less than B, Oxidation potential of C more than A, So the reaction that occurs spontaneously:

ⓐ $B^0 + A^+ \longrightarrow B^{2+} + A^0$
ⓑ $B^0 + C^+ \longrightarrow B^{2+} + C^0$
ⓒ $C^0 + A^{2+} \longrightarrow C^{2+} + A^0$
ⓓ $A^0 + C^{2+} \longrightarrow A^{2+} + C^0$

5 A gas X at 1 atm is bubbled through a solution contains a mixture of 1M Y^- and 1M Z^- at 25°C. If the reduction potential of Z>X>Y, then:

ⓐ Y will reduce X but Z not
ⓑ Z will reduce X but Y not
ⓒ Y &Z will oxidize X
ⓓ Neither Z nor Y will reduce X

6 if the half-cell reaction $X + e^- \longrightarrow X^-$ has large negative reduction potential it follows that........

ⓐ X is readily reduced.
ⓑ X is readily oxidized.
ⓒ X^- is readily reduced.
ⓓ X^- is readily oxidized.

7 Virtual metals (X, Y, Z) are arranged as reducing agents as (X > Y > Z), the correct statement:

ⓐ reduction potential of Y^{2+} more than Z^{2+}.
ⓑ Z^{2+} ions can be reduced easily than X^{2+}ions.
ⓒ We can store Z solution in bowl made of Y metal.
ⓓ We can stir Y solution by a spoon made of X metal.

8 $Mn^{2+} + 2e^- \rightarrow Mn$, E°=-1,18 V
$Mn^{2+} \rightarrow Mn^{3+} + e^-$, E°=-1.51 V
the E° for the reaction
$3Mn^{2+} \rightarrow Mn^0 + 2Mn^{3+}$ and possibility of reaction to occur naturally are ....

ⓐ -4.18 V and possible.
ⓑ +0.33 V and possible.
ⓒ -2.69 V and not possible.
ⓓ +2.69 V and not possible.

9 During the operation of the fuel cell the p^{OH} of the solution would....

ⓐ Remain unchanged.
ⓑ Decrease.
ⓒ Increase.
ⓓ Decrease initially, and then return to its former value.

10 During discharge of lead acid battery the density ......and p^{OH}.........

ⓐ increases, decreases.
ⓑ decreases, increases.
ⓒ increases, increases.
ⓓ decreases, decreases.

11 The best method to protect iron from rusting, is connecting it to metal ....

ⓐ causes transition of electrons from iron.
ⓑ causes transition of electrons to iron.
ⓒ with higher reduction potential than iron.
ⓓ more than one is correct.



12 If you know that :

$Zn_{(s)} \rightarrow Zn^{2+}_{(aq)} + 2e^-$ $E^o = +0.76$ V

$Al^{3+}_{(aq)} + 3e^- \rightarrow Al_{(s)}$ $E^o = -1.67$ V

What is the chemical reaction which achieved a potential of -0.91 V?

- (a) $2Al_{(s)} + 3Zn^{2+}_{(aq)} \rightarrow 2Al^{3+}_{(aq)} + 3Zn_{(s)}$.
- (b) $Al_{(s)} + Zn^{2+}_{(aq)} \rightarrow Al^{3+}_{(aq)} + Zn_{(s)}$.
- (c) $3Zn_{(s)} + 2Al^{3+}_{(aq)} \rightarrow 3Zn^{2+}_{(aq)} + 2Al_{(s)}$.
- (d) $Zn_{(s)} + Al^{3+}_{(aq)} \rightarrow Zn^{2+}_{(aq)} + Al_{(s)}$.

13 Knowing that the standard reduction potential of each of (nickel, iron, copper and aluminum) is (- 0.25 V , - 0.4 V , + 0.34 V and – 1.67 V) respectively, so …….

- (a) copper ion oxidizes aluminum and does not oxidize iron .
- (b) nickel reduces iron ion and does not reduce copper ion .
- (c) aluminum ion oxidizes iron and does not oxidize copper .
- (d) iron ion oxidizes aluminum and reduces nickel .

14 Iron metal rusts faster in all of these cases except:

- (a) if iron contains impurities of metal has lower (+ve) oxidation pot.
- (b) if water contains greater amount of dissolved ions .
- (c) touching iron surface to water in which oxygen gas is dissolved .
- (d) connecting iron to more active metal .

15 All the following are correct about recharging of lithium- ion battery except………

- (a) the mass of –ve pole increases .
- (b) +ve pole is lithium cobalt oxide .
- (c) the mass of +ve pole increases .
- (d) electrons move toward –ve pole .

16 The oxidation reduction reactions in the Mercury cell lead to:

- (a) transferring of potassium ions towards positive electrode .
- (b) transferring of potassium ions towards negative electrode .
- (c) zinc ions are converted to zinc atoms by reduction .
- (d) hydroxide ions are converted to oxygen molecules by oxidation .

17 P^{OH} value of solution in SHE can be increased if it's connected in a cell in which …………..

- (a) other electrode is zinc half cell .
- (b) electrons flow in external circuit toward SHE .
- (c) other electrode is less active than hydrogen .
- (d) more than one correct .

18 …… metal reacts completely with dilute hydrochloric acid to produce 100 mL of hydrogen gas in the longest time.

(a)	W	R.P.= -0.36V
(b)	X	O.P.= +0.82V
(c)	Y	R.P.= +1.2V
(d)	Z	O.P.= -0.26V

19 Consider the following reactions:

$X(NO_3)_2 + Y \rightarrow X + Y(NO_3)_2$

$X(NO_3)_2 + Z \rightarrow X + Z(NO_3)_2$

$Y(NO_3)_2 + Z \rightarrow Y + Z(NO_3)_2$

So the arrangement of these elements according to their oxidation potential is :

- (a) X > Y > Z .
- (b) Y > Z > X .
- (c) Z > Y > X .
- (d) X > Z > Y .

20 The following table shows the reduction potentials of some elements

Element	Reduction potential
W	-2.37
Z	-1.66
Y	-0.74
X	-0.25

which of the following is anodic protection ……

- (a) element Y is covered by element Z .
- (b) element Y is covered by element X .
- (c) element W is covered by element Z .
- (d) element W is covered by element X .

21 Which of the following is correct during discharge of lead acid battery?

- (a) Concentration of acid increases and its density decreases .
- (b) Concentration of acid decreases and its density increases .
- (c) The oxidation number of cathode changes from (4+ to 2+) .
- (d) The oxidation number of anode changes from (0 to 4+) .

22 During operation of fuel cell what happens to the hydrogen of hydroxide group?

- (a) Oxidation happens and 4 electrons lost .
- (b) Oxidation happens and 2 electrons lost
- (c) Oxidation and reduction don't happen
- (d) Reduction happens and 4 electrons gained

23 Galvanic cell its cell diagram:

$Fe^0/Fe^{2+}//Ni^{2+}/Ni^0$

$Fe_{(s)} \rightarrow Fe^{2+}_{(aq)} + 2e^-$, $E^o = +0.409$V

$Ni^{2+} + 2e^- \rightarrow Ni_{(s)}$, $E^o = -0.23$V

so emf to this cell equals …………

- (a) 1.639V .
- (b) 0.936V .
- (c) 0.396V .
- (d) 0.179V .

24 An electronic cell its electrodes made of chromium and platinum, if the standard reduction potentials as follows:

$Cr^{3+}_{(aq)} + 3e^- \rightarrow Cr_{(s)}$ $E^o = -0.727\ V$

$Pt^{2+}_{(aq)} + 2e^- \rightarrow Pt_{(s)}$ $E^o = +1.2\ V$

The diagram which represents this

- (a) $2Cr_{(s)} / 2Cr^{3+}_{(aq)} // 3Pt^{2+}_{(aq)} / 3Pt^0_{(s)}$.
- (b) $3Pt^{2+}_{(aq)} / 3Pt^0 // 2Cr^{3+}_{(aq)} / 2Cr^0_{(s)}$.
- (c) $Pt^{2+}_{(aq)} / Pt_{(s)} // 2Cr^0_{(s)} / 2Cr^{3+}_{(aq)}$.
- (d) $Cr_{(s)} / Cr^{3+}_{(aq)} // Pt^{2+}_{(aq)} / Pt_{(s)}$.

25

Element	Standard oxidation potential
(A)	+2.71
(B)	+0.28
(C)	-1.2
(D)	-2.87

The previous table represents the standard oxidation potential of four elements A,B,C&D

The galvanic cell produces the highest e.m.f is……

- (a) (D) as an anode, (C) as a cathode .
- (b) (A) as an anode, (D) as a cathode .
- (c) (B) as an anode, (D) as a cathode .
- (d) (D) as an anode, (A) as a cathode .

26 On dipping a magnesium strip in silver nitrate solution, the following reaction is occurred:

$Mg_{(s)} + 2\ AgNO_{3(aq)} \rightarrow Mg(NO_3)_{2(aq)} + 2Ag_{(s)}$

Which of the following properly expresses what happens?

- (a) Oxidation of magnesium and oxidation of silver .
- (b) Oxidation of magnesium and reduction of silver ions .
- (c) Reduction of magnesium and of oxidation silver .
- (d) Reduction of magnesium and reduction of silver ions .

27 Three rods of different elements (A , B , and C) are put in $HCl_{(aq)}$, (A)and (B) react , while (C) doesn't react , when a rod of element (A) is put in a solution contains ions of element (B) , it is corroded So the arrangement of these elements according to their oxidation potential is ....

- (a) A>B>C .
- (b) B>A>C .
- (c) C>B>A .
- (d) A>C>B .

28 The oxidation reduction reactions in the Fuel cell lead to :

- (a) Transferring of Hydroxide ions towards Anode .
- (b) Transferring of Hydroxide ions towards Cathode .
- (c) Oxygen is converting to Hydroxide ion by oxidation .
- (d) Hydrogen is converting to water molecules by reduction .

29 In lithium ion battery, lithium ions transfer through ($LiPF_6$) as follow:

- (a) From the negative anode to the positive cathode during discharging .
- (b) From the negative anode to the positive cathode during charging .
- (c) From the cathode to the anode during discharging .
- (d) From the cathode to the anode during charging .

30 The electrolyte which leads to the corrosion of metals with a high rate is :

- (a) H_2SO_4(0.5M) .
- (b) HCl(0.5M) .
- (c) HNO_2(1M) .
- (d) H_2SO_3(1M) .

31 1- A is monoprotic acid & B is diprotic acid both of them are strong, which of the following solutions is(are) used to make the standard potential of hydrogen = zero (molar mass of A=36.5g/mole, molar mass of B=98g/mole,

- (a) On dissolving 36.5g of A in 500ml of distilled water .
- (b) On dissolving 24.5g of B in 0.5L of distilled water .
- (c) On dissolving 73.5g of B in 2L of distilled water .
- (d) On dissolving 36.5g of A in 2000ml of distilled water .

32 The potential of car battery equals the potential of ....cells of lithium ion battery connected in series.

- (a) 2
- (b) 3
- (c) 4
- (d) 6

33 Four metallic elements X, Y, Z and W, by heating :

- metal Z + oxide of metal W → oxide of metal Z + metal W
- metal X + oxide of metal Z → no reaction
- metal X + oxide of metal Y → oxide of metal X + metal W
- metal X + oxide of metal W → no reaction

- So, the correct arrangement of these elements according to their chemical activity is ....

- (a) Y < X < W < Z .
- (b) X < Y < Z < W .
- (c) Y X < Z < W .
- (d) X < Z < W < Y .

34 If you know that, the standard reduction potential of element X is -1.6 V in the following galvanic cell : $X_{(s)} + 2H^+_{(aq)} \rightarrow H_{2(g)} + X^{2+}_{(aq)}$
- Find the oxidizing agent and the value of emf in the previous cell? ....

Choice	Oxidizing agent	e.m.f
(a)	X	1.6 V
(b)	H^+	1.6 V
(c)	H^2	1.6 V
(d)	H^+	- 1.6 V

35 On forming a galvanic cell from sodium half-cell and hydrogen half-cell,..........

ⓐ p^H value of the solution in hydrogen half-cell is decreased .
ⓑ p^H value of the solution in hydrogen half-cell is increased .
ⓒ sodium ions is deposited in the form of atoms .
ⓓ Standard hydrogen electrode becomes negative pole .

36 What is the oxidation reaction which takes place on scratching a piece of iron coated with yellow copper (brass)? ....

ⓐ $Fe_{(s)} \rightarrow Fe^{2+}_{(aq)} + 2e^-$.
ⓑ $Cu_{(s)} \rightarrow Cu^{2+}_{(aq)} + 2e^-$.
ⓒ $Fe_{(s)} \rightarrow Fe^{3+}_{(aq)} + 3e^-$.
ⓓ $Zn_{(s)} \rightarrow Zn^{2+}_{(aq)} + 2e^-$.

37 Lithium exists in the beginning of electromotive series so, if it is compared with copper, it is noticed that ....

ⓐ The standard potential Li^+ / Li is lower than that of Cu^{2+} / Cu .
ⓑ The standard potential Cu^{2+} / Cu is lower than that of Li^+ / Li.
ⓒ The standard potential Li / Li^+ is lower than that of Cu / Cu^{2+}.
ⓓ The standard potential Cu / Cu^{2+} is higher than that of Li / Li^+.

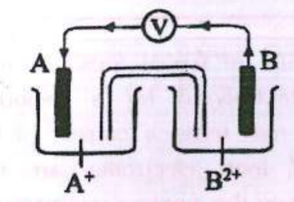
38 From the following redox reactions :
(1) $Mg_{(s)} + 2HCl_{(aq)} \rightarrow MgCl_{2(aq)} + H_{2(g)}$
$E^\circ cell = + 2.375 V$
(2) $Fe_{(s)} + 2HCl_{(aq)} \rightarrow FeCl_{2(aq)} + H_{2(g)}$
$E^\circ cell = + 0.409 V$
(3) $Mg_{(s)} + FeCl_{2(aq)} \rightarrow MgCl_{2(aq)} + Fe_{(s)}$
$E^\circ cell = + 1.966 V$
- What is the correct arrangement of the previous reactions from the slower to the faster? ....

ⓐ (3) < (2) < (1) .
ⓑ (3) < (1) < (2) .
ⓒ (1) < (3) < (2) .
ⓓ (2) < (3) < (1) .

39 If you know that element X is located after hydrogen in electromotive series , which of the following is correct?

Choice	$X_{(s)} + HCl$	$XO_{(s)} + H_{2(g)}$
(a)	$H_{2(g)}$ is evolved	No reaction occurs
(b)	$H_{2(g)}$ is evolved	The oxide is reduced
(c)	No reaction occurs	No reaction occurs
(d)	No reaction occurs	The oxide is reduced

40 What is the cell diagram of the opposite shape?



ⓐ $B / B^{2+} // A^+ / A$.
ⓑ $B / B^{2+} // 2A^+ / 2A$.
ⓒ $A / A^{2+} // B^+ / B$.
ⓓ $2A / 2A^{2+} // B^+ / B$.



No.	Answer	No.	Answer
1	B	2	D
3	C	4	C
5	A	6	D
7	B	8	C
9	A	10	D
11	B	12	C
13	D	14	D
15	C	16	A
17	D	18	A
19	C	20	A
21	C	22	C
23	D	24	A
25	B	26	B
27	A	28	A
29	A	30	A
31	B	32	C
33	A	34	B
35	B	36	D
37	A	38	D
39	D	40	B









40 ideas for electrolytic cells

1 How many faradays needed to convert one mole of $MnO4^-$ to Mn^{2+}?

ⓐ 2 ⓒ 10
ⓑ 7 ⓓ 5

2 4.5 g of aluminum is deposited at cathode from Al^{3+} solution by a certain quantity of electric charge. the volume of hydrogen produced at STP from H^+ ions in solution by the same quantity of electric charge will be .... (Al=27,H=1) .

ⓐ 44.8L ⓒ 11.2L
ⓑ 22.4L ⓓ 5.6 L

3 Two cells containing XSO_4 & Y_2SO_4 respectively are connected in series. In a given experiment if the ratio between atomic mass of X&Y is 2: 1 the ratio between mass of X&Y is....

ⓐ 1:1 ⓒ 2:1
ⓑ 1:2 ⓓ 1:4

4 In experiment of purification of copper from impurities at the end of experiment : (X)metal is dissolved as ions but not deposit at cathode & (Y) is precipitated solid at the bottom, so reduction potentials:

ⓐ (X) > (Y) > (Cu) .
ⓑ (Y) > (Cu) > (X) .
ⓒ (X) > (Cu) > (Y) .
ⓓ (Cu) > (X) > (Y) .

5 During electroplating spoon of iron by a layer of metal X which of the following is (are) correct?

ⓐ $Fe^{2+} + 2e^- \rightarrow Fe$ at cathode .
ⓑ connect iron spoon to –ve (cathode) .
ⓒ use solution of iron solution .
ⓓ more than one correct .

6 One of the following occurs by electrolysis of molten AgCl knowing that the poles made of platinum ......

ⓐ mass of cathode increases and chlorine gas evolved at anode .
ⓑ mass of anode increases .
ⓒ anode dissolves and mass of cathode increases .
ⓓ gases evolved at both poles .

7 By electrolysis of molten AgCl using graphite poles, no. of Cl_2 molecules .... no. of silver atoms.

ⓐ equal to ⓒ half
ⓑ double ⓓ 4 times

8 If 0.50L of 0.60M $SnSO_4$ solution is electrolyzed for a period of 30.0 min using a current of 4.60 A. if inert electrodes are used what is the final concentration of Sn^{2+} remaining in the solution? (Sn=119, S=32, O=16)

ⓐ 0.342M . ⓒ 0.389M .
ⓑ 0.553M . ⓓ 0.514M .

9 According to the following reaction ....faradays needed to oxidize 0.5 mole sodium chloride to sodium perchlorate

$$NaCl + 4H_2O \rightarrow NaClO_4 + 4H_2$$

ⓐ 8 ⓒ 2
ⓑ 4 ⓓ 16

10 A current of 1.85 A was passed through a solution containing $X^{2+}_{(aq)}$ ions for precisely 5 minutes, 0.169 g of metallic X was deposited on the inert platinum cathode over this time. Metal X is most likely to be ....

(Cu=63.5 ,Ni =58.7,Zn=65.38,Al=27)

ⓐ Copper ⓒ Zinc
ⓑ Nickel ⓓ Aluminum

11 In purification of metal A from its impurities (B&C) (knowing that the reduction potential of A= 1V ,B=2V , C= -1V) All the following are correct except.............

ⓐ the used cell potential may 1.1V .
ⓑ metal B dissolve at anode & not deposit at cathode .
ⓒ we can't get metal C from this experiment .
ⓓ metal A dissolve at anode & deposit at cathode .

12 To protect railways from rusting we connect it to more active metal inside box this method is similar to ....

ⓐ galvanization .
ⓑ cathodic protection .
ⓒ protection of ships .
ⓓ more than one are correct .

13 0.0324 faradays liberated 0.651g of metal M from its chloride MCl_2, what is the atomic mass of M ?

ⓐ 40.2 ⓒ 4.024
ⓑ 20.12 ⓓ 5.6

14 By passing quantity of electricity equal 289500 C in solution of salt of a metal; one mole produced so the valency of this metal = ...

ⓐ 1 ⓒ 3
ⓑ 2 ⓓ 4

15 what is the quantity of electricity which is required to liberate half a gram equivalent mass of an element?

ⓐ 48250F ⓒ 193000F
ⓑ 48250C ⓓ 193000C

16 On passing 2mol of electrons in cerium solution, 70g of cerium were deposited at the cathode, what is the formula of cerium ion in this solution? (Ce=140)

ⓐ Ce^{+} ⓒ Ce^{3+}
ⓑ Ce^{2+} ⓓ Ce^{4+}

17 An electrolytic cell its two electrodes are made of copper, and its electrolyte is $CuCl_{2(aq)}$, after a period of operation, the mass of the cathode increased by 3.175 g ... What happened at the anode? (Cu=63.5)

ⓐ 0.01 mol of Cu^{2+} were transferred from it to the electrolyte .
ⓑ 0.05 mol of Cu^{2+} were transferred from it to the electrolyte.
ⓒ 1.1 L of $Cl_{2(g)}$ were evolved at it (at STP) .
ⓓ 1.1 L of $O_{2(g)}$ were evolved at it (at STP) .

18 Electrolytic cell is composed of two electrodes one of them is known as cathode and the other as anode ... Which of the following is true for electrolytic cells?

ⓐ The electrons move in electrolyte from the cathode to the anode .
ⓑ The electrons move in the outer circuit in the direction of the cathode .
ⓒ Negative ions move in the outer circuit in the direction of the anode .
ⓓ Positive ions move in the outer circuit in the direction of the anode .

19 find the quantity of electricity which is needed to precipitate 0.5g of gold on medal by electrolysis according to the reaction:
$Au^{3+} + 3e \rightarrow Au^{0}$? (Au=196.98)

ⓐ 2.53×10^{-3} F
ⓑ 7.61 F
ⓒ 7.61×10^{-3} F
ⓓ 2.53 F

20 Lithium can't act as .... agent , because it has lowest ....if it's compared with other elements.

ⓐ oxidizing , oxidation potential .
ⓑ reducing , oxidation potential .
ⓒ oxidizing , reduction potential .
ⓓ reducing, reduction potential .

21 When 10 amperes passed for two hours through the molten iron III oxide, the volume of evolved gas at anode at (S.T.P) is.......... (Fe=56,O=16)

ⓐ 16.68 liter .
ⓑ 12.51 liter .
ⓒ 8.35 .
ⓓ 4.17 liter .

22 To precipitate 10g of element (A) according to the equation :
$A^{2+} + 2e^{-} \rightarrow A$ (A=63.5) ,
The quantity of electricity =...................

ⓐ 30393F ⓒ 15196C
ⓑ 0.675C ⓓ 0.315F

23 The quantity of electricity which is needed to precipitate equivalent mass of metal equals the quantity of electricity which is needed to precipitate 1mole from it, which of the following is correct about these processes?

ⓐ mole of ion of metal gain mole of electron .
ⓑ mole of metal lose mole of electron .
ⓒ mole of ion of metal gain 2moles of electron .
ⓓ mole of metal lose 2moles of electron .

24 From the following cell:

solution (B) solution (A)

Which of the following is correct?

ⓐ It is a galvanic cell and concentration of solution (A) increases .
ⓑ It is a galvanic cell and concentration of solution (B) increases .
ⓒ It is an electrolytic cell and concentration of solution (A) decreases .
ⓓ It is an electrolytic cell and concentration of solution (B) decreases .

25 Alloy of copper and gold its mass 20 g is put as anode in an electrolytic cell contains copper II sulphate solution, supposing that, all copper of alloy is dissolved in the solution and precipitated completely on the cathode by passing a current of intensity 5A for two hours. What is the percentage of gold in the alloy? ......[Cu = 63.5]

ⓐ 40.78 % ⓒ 70.39 %
ⓑ 59.22 % ⓓ 29.61 %

26 All the following electrolytes decrease the illumination of lamp in Daniel cell except ....

ⓐ $(CH_3COO)_2Pb$.
ⓑ $CaCl_2$.
ⓒ $BaCl_2$.
ⓓ KNO_3 .

27 Electroplating process was performed on a slit of copper by passing a quantity of electricity of 0.5 F in aqueous solution of $AuCl_3$ (plating on one side only).
- What is the volume of precipitated gold layer? .... cm_3
(Knowing that, the atomic mass of gold is 196.98 and its density is 13.2 g/cm_3)

ⓐ 2.487 ⓒ 1.244
ⓑ 4.974 ⓓ 3.731

28 To get 11.2L of hydrogen gas at STP by electrolysis of water through an hour and half, all the following are correct except............

ⓐ the current intensity = 17.87A .
ⓑ the mass of evolved oxygen = 8g .
ⓒ the mass of evolved hydrogen = 8g .
ⓓ the volume of evolved oxygen at STP = 5.6L .

29 To recharge a car battery, an electric source can be used its electromotive force equals ....

ⓐ 12.8 V .
ⓑ 50 V .
ⓒ 5 V .
ⓓ 12 V .

30 Iron pylons are connected with another metal with wire, the pylons were rusted while metal won't rust that means.....

ⓐ the pylon will receive electrons from metal .
ⓑ the metal will receive electrons from pylon .
ⓒ the metal is more active than the pylon .
ⓓ the used metal is zinc .

31 On passing 1.5 F in metal chloride solution, 0.75 mol. of the metal M will precipitate so, the formula of that salt is ....

ⓐ MCl .
ⓑ MCl_2 .
ⓒ MCl_3 .
ⓓ M_2Cl .

32 By passing .... 12.04×10^{23} atoms of chromium are formed from its solution contains Cr^{2+} .

ⓐ 4F
ⓑ 4 C
ⓒ 386000C
ⓓ more than one correct

33 When the iron nail expose to rusting it reacts with oxygen and water.
- What will happen to the total mass of the nail? ....

ⓐ Remain constant .
ⓑ Decreased .
ⓒ Increased .
ⓓ Decreased then increased .

34 the amount of electrons which is needed to evolve twice molar volume of oxygen gas at STP = ...

ⓐ $8 \times 6.02 \times 10^{23} e^-$.
ⓑ $4 \times 6.02 \times 10^{23} e^-$.
ⓒ $2 \times 6.02 \times 10^{23} e^-$.
ⓓ $8\ e^-$.

35 Which of the following reduction processes produces one mole of the metal on passing a quantity of electricity of 193000 C? ....

ⓐ $Ag^+_{(aq)} + e^- \rightarrow Ag_{(s)}$.
ⓑ $Pb^{2+}_{(aq)} + 2e^- \rightarrow Pb_{(s)}$.
ⓒ $Al^{3+}_{(aq)} + 3e^- \rightarrow Al_{(s)}$.
ⓓ $Pt^{4+}_{(aq)} + 4e^- \rightarrow Pt_{(s)}$.

36 The same quantity of electricity was passed through two analytical cells connected on series, if the number of precipitated moles of metal (X) in the first cell is 0.08 mol. while the number of precipitated moles of metal (Y) in the second cell is 0.16 mol. and if the symbol of metal ion in the first cell (X^{+2}), so, what is the symbol of metal ion in the second cell? ....

ⓐ Y^+
ⓑ Y^{2+}
ⓒ Y^{3+}
ⓓ Y^{4+}

37 During electrolysis of metal III oxide, the volume of evolved oxygen is 1.12L at STP & mass of deposited metal =6.8g , all the following are correct except...........

ⓐ the mass of evolved oxygen = 8g .
ⓑ the atomic mass of the metal = 102g .
ⓒ the amount of passed electricity = 0.2F .
ⓓ the equivalent mass of the metal =34g .

38 On passing current with intensity 6A for 16 min. in molten chromium oxide 1.034g of chromium deposited, the chemical formula of the oxide is .... (Cr=52).

ⓐ CrO
ⓑ Cr_2O_3
ⓒ CrO_2
ⓓ Cr_2O_5

39 On passing a quantity of electricity in three cells connected on series containing silver nitrate, copper II sulphate and gold III chloride, which of the following is represents the values of number of moles of precipitated cations (n) at the cathode of each cell? ....

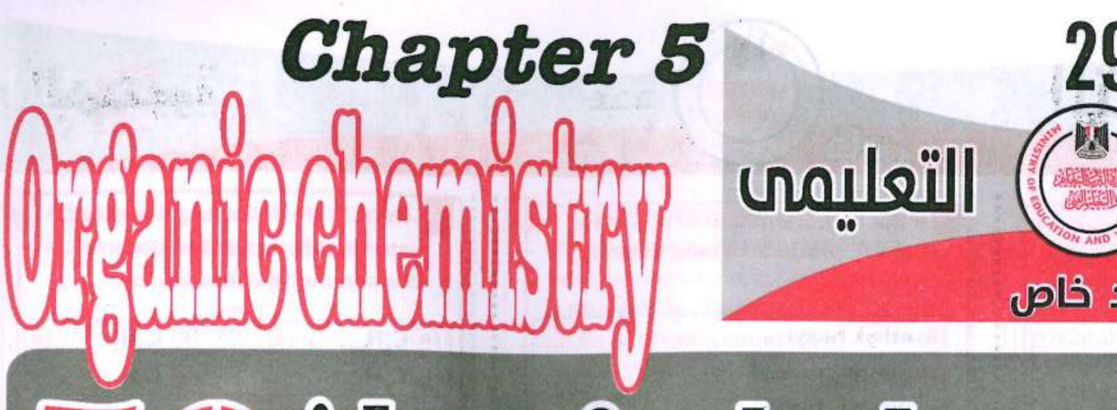
ⓐ $n_{(Ag)} = n_{(Cu)} = n_{(Au)}$.
ⓑ $n_{(Ag)} < n_{(Cu)} < n_{(Au)}$.
ⓒ $n_{(Ag)} > n_{(Cu)} > n_{(Au)}$.
ⓓ $n_{(Ag)} = n_{(Cu)} > n_{(Au)}$.

40 Two cells are connected on series, the first contains copper II sulphate solution and the second contains chromium III sulphate solution. If the precipitated quantity of copper on the cathode of first cell is 0.125 mol. What is the number of chromium moles which are precipitated on the cathode of the second cell at the same time?.

ⓐ 0.166 mol
ⓑ 0.083 mol
ⓒ 0.332 mol
ⓓ 0.042 mol

Answers

No.	Answer	No.	Answer
1	D	2	D
3	A	4	B
5	B	6	A
7	C	8	D
9	B	10	B
11	B	12	C
13	A	14	C
15	B	16	D
17	B	18	B
19	C	20	C
21	D	22	D
23	A	24	A
25	A	26	D
27	A	28	C
29	A	30	B
31	B	32	D
33	C	34	A
35	B	36	A
37	A	38	B
39	C	40	B





50 ideas for hydrocarbons

1 The correct IUPAC name for: $CH_3CH_2CH_2(CH_3)C(CH_2CH_2CH_3)CH_2CH_3$ is ……………

- ⓐ 5-methyl-5-propylheptane .
- ⓑ 4-ethyl-4-methylheptane .
- ⓒ 3-methyl-3-propyloctane .
- ⓓ 3-methyl-3-propylhexane .

2 The correct IUPAC name for the following name (3,3 dimethyl 1-propene) is ………

- ⓐ 3-methyl-1-butene .
- ⓑ 1,1-dimethyl-1-propene .
- ⓒ 3-methyl-2-butene .
- ⓓ 1,1-dimethyl-2-propene .

3 The IUPAC name for the following compound is (benzene ring with C_2H_5, Cl, NO_2)

- ⓐ 3-chloro-1-ethyl-5-
- ⓑ 3-chloro-5-ethyl-1-
- ⓒ 5-nitro-1-chloro-3-ethylbenzene .
- ⓓ 1-chloro-3-ethyl-5-nitrobenzene .

4 Predict the name of product C obtained from the following reaction …………

$CH_3CH_2-C\equiv CH + HCl \rightarrow B \xrightarrow{HI} C$

- ⓐ 1-chloro-1-iodobutane .
- ⓑ 1-chloro-2-iodobutane .
- ⓒ 2-chloro-2-iodobutane .
- ⓓ 2-chloro-4-iodobutane .

5 $CaC_2 \xrightarrow{H_2O} (A) \xrightarrow{\text{red hot Ni tube}} (B) \xrightarrow{Cl_2/UV} (C)$

C is ………

- ⓐ toluene .
- ⓑ benzene .
- ⓒ chlorobenzene .
- ⓓ gamixane .

6 What's the starting organic compound which passed through the following successive reactions catalytic hydration, oxidation, neutralization, dry distillation, forming the simplest organic compound?

- ⓐ Ethyne
- ⓑ Ethene
- ⓒ Propyne
- ⓓ propene

7 Which branched chain isomer of saturated hydrocarbon with molecular mass 72 u gives only one isomer of mono substituted alkyl halide? (C=12,H=1)

- ⓐ 2-methylbutane .
- ⓑ Cyclopentane .
- ⓒ 2,2-dimethylpropane .
- ⓓ More than one correct .

8 Number of isomers of mono-substituted hydrocarbon derivative from alkane if you know that it contain one bromine atom is …………knowing that the molar mass of the compound is 137 g/mole (C=12,H=1,Br=80) .

- ⓐ 2
- ⓑ 4
- ⓒ 6
- ⓓ 5

9 The monomer of polymer that's strong & hard used in making carpets & cans undergo a reaction:

- ⓐ can't remove color of bromine water .
- ⓑ applies Markownikoff's rule .
- ⓒ can't be oxidized
- ⓓ more than one correct .

10 The compound that contains 85.45% carbon and 14.55% hydrogen is not obey the formula of:

- ⓐ alkene
- ⓑ cyclo alkane
- ⓒ alkane
- ⓓ methylene group

11 Which of the following steps to obtain compound its name meta chloro nitrobenzene from aliphatic compound formed from six carbons atoms ?

- ⓐ polymerization –nitration – chlorination in presence of U.V/ $FeCl_3$.
- ⓑ catalytic reforming - nitration – chlorination in presence of U.V/ $FeCl_3$.
- ⓒ polymerization – chlorination – nitration in presence of U.V/$FeCl_3$.
- ⓓ catalytic reforming - nitration – chlorination in presence of U.V .

12 Number of hydrogen atoms required to saturate 5 molecules of pentyne equal:

- ⓐ 10
- ⓑ 20
- ⓒ 5
- ⓓ 15

13 Which of the following is considered as a similarity between catalytic cracking and polymerization?

ⓐ Boiling point increases after doing process .
ⓑ Benefits increase after doing process .
ⓒ Mass remains constant after doing process .
ⓓ More than one correct .

14 Liquid hydrocarbons can be converted into two mixture of gaseous hydrocarbons by …………

ⓐ oxidation .
ⓑ cracking .
ⓒ distillation under pressure .
ⓓ hydrolysis .

15 The molecular formula of 2-nitro-3-phenyl-1-pentene is…………………………

ⓐ $C_{11}H_{14}NO_2$.
ⓑ $C_{12}H_{14}NO_2$.
ⓒ $C_{11}H_{12}NO_2$.
ⓓ $C_{11}H_{13}NO_2$.

16 Choose the most abundant product of CH_2=CH-CH=CH_2 + H_2 reaction? The molar ratio between reactants is 1:1.

ⓐ 1-butene
ⓑ 2-butene
ⓒ butane
ⓓ 1,2-butadiene

17 Which of the following compounds is more active? …………

ⓐ △ ⓑ △ ⓒ □ ⓓ □

18 If the hydrogenation of R_1 – CH = CH – R_2 produce octane the R_1,R_2 may be……, …….

ⓐ ethyl, hexyl .
ⓑ pentyl , propyl .
ⓒ propyl , butyl .
ⓓ butyl , ethyl .

19 If 90 g of water is produced by combustion of one mole of alkane , the alkane is …….. (H=1,O=16).

ⓐ C_2H_6 ⓒ C_4H_{10}
ⓑ C_3H_8 ⓓ C_5H_{12}

20 Which of the following steps to obtain compound its name T.N.T from phenol

ⓐ Dry distillation– alkylation– nitration .
ⓑ Dry distillation – nitration – alkylation .
ⓒ Reduction– friedelcrafts– nitration .
ⓓ Reduction – nitration – friedelcrafts .

21 All the following have the same empirical formula except…………

ⓐ C_2H_4O . ⓒ $C_6H_{12}O_3$.
ⓑ $C_4H_8O_2$. ⓓ $C_5H_{10}O_3$.

22 While dry distillation of sodium acetate then strong heating and fast cooling for the product and catalytic hydration then oxidation then reduction we obtain ………

ⓐ ethanal .
ⓑ ethanoic acid .
ⓒ ethyl acetate .
ⓓ ethanol .

23 If the compound (B) contains two carbon atoms

$$(A) + H_2O \xrightarrow[HgSO_4]{H_2SO_4\ (40\%)} (B) \xrightarrow{rearangement} (C)$$

Which one of the following represents the isomer of compound (C)…………………

ⓐ CH_3CH_2OH .
ⓑ CH_3CHO .
ⓒ CH_2CHOH .
ⓓ $C_2H_4O_2$.

24 which of the following represents saturated hydrocarbon doesn't contain methyl group?

ⓐ C_5H_{12} . ⓒ C_7H_8 .
ⓑ C_6H_{12} . ⓓ C_7H_{12} .

25 If hydrogen atom was replaced in ethene by methyl group then the produced compound polymerized, So the polymer is used in:

ⓐ shoes and hoses .
ⓑ plastic glasses .
ⓒ cooking utensils .
ⓓ Carpets .

26 When 1-phenyl 2-methyl butane reacts with Chlorine in presence of catalyst and Hydrogen atom from the phenyl group will be substituted with a halogen in position(s)……………….

ⓐ ortho .
ⓑ meta .
ⓒ para .
ⓓ ortho &para .

27 Organic compound its molecular formula is C_4H_8 and it can't remove the red color of bromine water Which of the following is correct?

ⓐ Can react with one mole of chlorine forming dichloro compound .
ⓑ More inflammable than cyclopropane .
ⓒ Can remove the violet color of alkaline $KMnO_4$.
ⓓ It reacts by substitution .

28 By nitration of compound produced from catalytic reforming of normal heptane……….is formed .

ⓐ insecticide
ⓑ detergent
ⓒ explosive substance its molecular formula $C_6H_3N_3O_7$
ⓓ explosive substance its molecular formula $C_7H_5N_3O_6$

29 Alkyne which contains one triple bond and 28 atoms contains .... carbon atoms.

ⓐ 7 ⓒ 9
ⓑ 8 ⓓ 10

30 The following table represents the molecular formulas of (X), (Y) substances:

X	Y
$C_2H_2Br_2$	C_4H_6

On adding a mole of bromine dissolved in carbon tetrachloride to a mole of X and Y, which of the following is correct:

ⓐ Bromine color is removed with X and not removed with Y.
ⓑ Bromine color is not removed with X and also not removed with Y.
ⓒ Bromine color is removed with X and also removed with Y.
ⓓ Bromine color is not removed with X and removed with Y.

31 The reaction of 1-butene with hydrogen peroxide (colorless) is ....

ⓐ redox reaction and detect the presence of double bond.
ⓑ oxidation only and is not detecting the presence of double bond.
ⓒ redox reaction and is not detecting the presence of double bond.
ⓓ oxidation only and detect the presence of double bond.

32 Number of methylene groups in 2,2-dimethylbutane is equal number of methyl groups in ....

ⓐ propene
ⓑ propane
ⓒ pentane
ⓓ ethyne

33 0.5 mole of Hydrocarbon compound reacts with 1 mole of Bromine dissolved in carbon tetrachloride, The formula of the producing compound is:

ⓐ $C_nH_{2n}Br_2$
ⓑ $C_nH_{2n-2}Br_2$
ⓒ $C_nH_{2n}Br_4$
ⓓ $C_nH_{2n-2}Br_4$

34 How many bonds exist in this compound H_2CCCH_2? ....

ⓐ $1\sigma, 1\pi$ ⓒ $6\sigma, 2\pi$
ⓑ $5\sigma, 1\pi$ ⓓ $7\sigma, 2\pi$

35 Two organic compounds A, B from open chain hydrocarbon, compound A has 3 carbon atoms while compound B has 6 carbon atoms and B is more active than A, then A & B are ....

ⓐ (A) is a gaseous alkane, (B) is a liquid alkene.
ⓑ (A) is a liquid alkane, (B) is a liquid alkene.
ⓒ (A) is a gaseous alkane, (B) is a gaseous alkene.
ⓓ (A) is a gaseous alkane, (B) is a liquid alkane.

36 1mol of ethene reacts with excess amount of chlorine, so number of moles of chlorine needed to get a halo-compound which doesn't contain any hydrogen atoms (in presence of suitable conditions) equals ....

ⓐ 1mol ⓒ 2.5mol
ⓑ 3mol ⓓ 5mol

37 Which property is correct about cyclobutane?

ⓐ Is less active than cyclopentane.
ⓑ Is more stable than normal pentane.
ⓒ Burns faster than cyclopentane.
ⓓ Burns slower than normal pentane.

38 The correct arrangement for the steps of preparing alkane from alkyne is ....

ⓐ Catalytic hydration -oxidation -neutralization by NaOH -dry distillation.
ⓑ dry distillation - neutralization by NaOH - Catalytic hydration – oxidation.
ⓒ neutralization by NaOH - dry distillation - Catalytic hydration - oxidation.
ⓓ Oxidation - dry distillation - neutralization by NaOH - Catalytic hydration.

39 X, Y & Z are three open chain hydrocarbons, X react is by addition twice, Y all bonds are strong sigma, Z removes the colour of $KMnO_4$ in alkaline medium

ⓐ X alkane, Y alkene, Z alkyne.
ⓑ X alkene, Y alkane, Z alkyne.
ⓒ X alkyne, Y alkane, Z alkene.
ⓓ X alkyne, Y alkene, Z alkane.

40 To obtain cycloalkane from calcium carbide, we will make the following steps:

ⓐ hydrogenation, reaction with water, polymerization.
ⓑ hydrogenation, polymerization, Reaction with water.
ⓒ Reaction with water, hydrogenation, polymerization.
ⓓ Reaction with water, polymerization, hydrogenation.

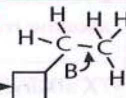
41 2 moles of bromine dissolved in carbon tetrachloride is added to 1 mole of each:
(1) ethane (2) ethene
(3) ethyne (4) aromatic benzene
- Which of the previous compounds can remove the red color of bromine solution completely? ....

ⓐ (2) / (3) / (4) only.
ⓑ (2) / (3) only.
ⓒ (1) only.
ⓓ (3) only.

42 On adding potassium permanganate solution in alkaline medium to the two substances (A) and (B) separately, it is observed that the color disappears with substance (A) only and does not disappear with (B), which of the following is correct? ....

- (a) Compound (A) is 2-methyl-2-pentene, the addition is done to carbon atoms number 1, 2 .
- (b) Compound (A) is 2-methyl-2-pentene, the addition is done to carbon atoms number 2, 3 .
- (c) Compound (B) is propene, the addition is done to carbon atoms number 2, 3 .
- (d) Compound (B) is propene, the addition is done to carbon atoms number 1, 2 .

43 Which of the following is right for the sigma bonds A and B ? .....



- (a) The bond (A) is easy to be broken while the bond (B) is difficult to be broken .
- (b) The bond (A) is difficult to be broken while the bond (B) is easy to be broken .
- (c) The bonds (A) and (B) are easy to be broken .
- (d) The bonds (A) and (B) Are difficult to be broken .

44 0.02 mole of alkene (X) is burned completely in excess amount of oxygen to form 0.896 L of carbon dioxide gas at (S.T.P). Deduce the molecular formula of that alkene? ....

- (a) C_2H_4
- (b) C_3H_6
- (c) C_4H_8
- (d) C_5H_{10}

45 On reacting the opposite compound with hydrobromic acid, 3-bromo-3-methyl pentane is formed so, the symbol (A) represents ....

A
H_3C — H
H_3C

- (a) H atom .
- (b) Methyl group.
- (c) Ethyl group .
- (d) Propyl group .

46 The least number of carbon atoms to form a branched alkyne is ..... while the least number of carbon atoms to form cyclo hydrocarbon is .....

- (a) 4 – 3
- (b) 5 – 3
- (c) 6 – 2
- (d) 7 – 4

47 Starting with acetic acid how can you obtain a substance used in shoes polishes? ....

- (a) Neutralization / oxidation / heating in absence of air .
- (b) Dry distillation / oxidation / heating in absence of air .
- (c) Oxidation / neutralization / thermal decomposition .
- (d) Neutralization / dry distillation / heating in absence of air.

48 What is the structural formula of the monomer which form the following polymer $(CH_2CCl_2)_n$? ....

- (a) $HC \equiv CCl$.
- (b) $ClHC=CClH$.
- (c) $Cl_2C=CH_2$.
- (d) $H_2C=CClH$.

49 Unsafe anesthetic substance can be prepared form a reaction of 1 molecule of methane with ....

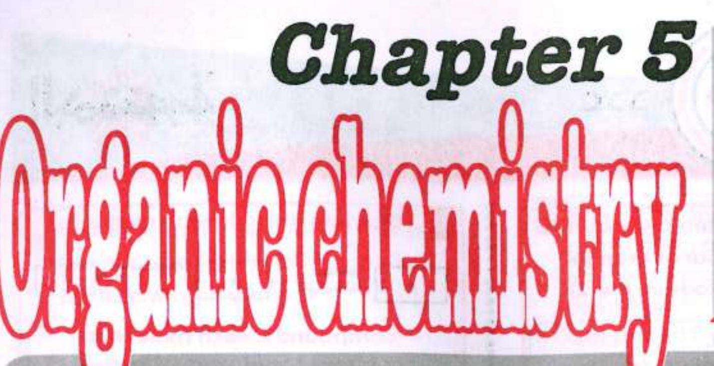
- (a) 1 molecule of chlorine gas .
- (b) 3 molecules of chlorine gas .
- (c) 2 molecules of chlorine gas and 2 molecules of fluorine gas .
- (d) 4 molecules of fluorine gas .

50 What is the correct nomenclature by IUPAC system for the compound (2-ethyl-3-pentyne) ? ....

- (a) 4-ethyl-2-pentyne .
- (b) 1-ethyl-1-methyl-2-butyne .
- (c) 4-methyl-2-hexyne .
- (d) 3-methyl- 4- hexyne .

Answers

No.	Answer	No.	Answer
1	B	2	A
3	D	4	C
5	D	6	A
7	C	8	B
9	B	10	C
11	B	12	B
13	D	14	B
15	D	16	A
17	B	18	D
19	C	20	C
21	D	22	D
23	C	24	B
25	D	26	D
27	D	28	D
29	D	30	C
31	C	32	A
33	D	34	C
35	A	36	D
37	C	38	A
39	C	40	D
41	D	42	B
43	A	44	A
45	C	46	B
47	D	48	C
49	B	50	C





50 ideas for derivatives of hydrocarbons

1 Compound which is used in dyes with molecular formula CH_2O_2 reacted with the simplest secondary alcohol and formed compound A which contains.........methyl group.

- ⓐ 1
- ⓑ 2
- ⓒ 3
- ⓓ 4

2 Which arrangement is correct according to P^H value?

- ⓐ Ethanol >carbolic acid >formic acid >oxalic acid.
- ⓑ Formic acid >oxalic acid > ethanol>carbolic acid.
- ⓒ Carbolic acid >formic acid> oxalic acid > ethanol.
- ⓓ Oxalic acid >carbolic acid > ethanol>formic acid.

3 The following table shows length of bonds between carbon atoms:

Type of bond	C – C	C = C	C≡C
Bond length (pm)	154	134	120

Which value suits to be length of C-C bonds in benzene?

- ⓐ 130
- ⓑ 160
- ⓒ 140
- ⓓ 110

4 According to the following reaction:

$(A) + HBr \longrightarrow (B) \xrightarrow{KOH/\Delta} (C)$

if compound A is branched alkene its molecular mass is 56g, so compound (C) is..........

- ⓐ tertiary butyl alcohol
- ⓑ 2-methyl-2-proponol
- ⓒ secondary alcohol
- ⓓ more than one correct

5 Two unsaturated organic compounds X , Y

X+ alcohol ⟶ Y

$Y + H_2O$ ⟶ X + alcohol

with differ in conditions

- ⓐ X&Y has same boiling point.
- ⓑ X has higher boiling point than Y.
- ⓒ X has lower boiling point than Y.
- ⓓ Can't be determined.

6 Arrange the following processes to get benzoic acid from acetic acid: (trimerization – dry distillation – oxidation – neutralization – rapid quenching – alkylation)

- ⓐ Neutralization/ dry distillation/ rapid quenching / trimerization/ alkylation/ oxidation.
- ⓑ Strong heating/ neutralization/ oxidation/ dry distillation/ trimerization/ alkylation.
- ⓒ Dry distillation/ neutralization/ rapid quenching / trimerization/ alkylation/ oxidation.
- ⓓ Oxidation/ rapid quenching / dry distillation/ neutralization/ trimerization/ alkylation.

7 If we heated octane in high temperature and pressure, we can differentiate between the products by using ....

- ⓐ bromine water.
- ⓑ alkaline solution of $KMnO_4$.
- ⓒ peroxide compounds.
- ⓓ more than one correct.

8 By burning liquid substance X it produces carbon dioxide and water vapor, if X contains Carbon, hydrogen and oxygen, the P^H value for substance X in water equals 7 what is the liquid X?

- ⓐ Ethanoic acid.
- ⓑ Gasoline.
- ⓒ Ethanol.
- ⓓ Methane.

9 Organic compound has the following structural formula:

```
   H  H  O
   |  |  ||
H–C=C–C–O–H
```

Which of the following properties appears during the detection of this compound practically?

(1) Remove the red color of bromine water.

(2) React with alcohols forming esters.

(3) React with sodium metal and hydrogen gas evolve.

- ⓐ (1) only
- ⓑ (1) & (2) only
- ⓒ (1) & (2) & (3)
- ⓓ (2) & (3) only

10 Which one of the following compounds can be oxidized?

- ⓐ C_6H_5COOH
- ⓑ $C_6H_4(COOH)_2$
- ⓒ $CH_3C(CH_3)(OH)CH_3$
- ⓓ $CH_2OH(CH_2)_3CH_3$

11 According to your study: protein considered as polymer formed by specific method so which of the following may form polymer with same type of polymerization

a) 2-bromo-2-butene.
b) Acetic acid & ethanol.
c) lactic acid.
d) Vinyl chloride.

12 All of the following pairs are considered as isomers except:

a) Ethyl benzoate and phenyl propanoate.
b) Methyl formate and ethanoic acid.
c) Ethyl methanoate and methyl acetate.
d) Propyl ethanoate and ethyl butanoate.

13 Which of these names is The IUPAC for name this compound $CH_3CH_2CH(CH_3)CH(CH_3)CH_2C(CH_3)_2COOH$

a) 2,3,4,4 tetramethyl -1- heptanoic acid.
b) 2,3,4,4 tetramethyl heptanoic acid.
c) 2,2,4,5 tetramethyl heptanoic acid.
d) 2,2-dimethyl nonanoic acid.

14 What is the IUPAC name of $C_6H_5CH_2CH(OH)CH_3$

a) 2-propyl 1- benzene.
b) 1 phenyl 2- propanol.
c) 2-nonanol.
d) more than one correct.

15 The correct name of 4-ethyl-2,3,3-trimethyl-7-octanol is..................

a) 6,6,7-trimethyl-5-ethyl-2-octanol.
b) 4-ethyl-2,3,3-trimethyl-2-octanol.
c) 5-ethyl-6-methyl-6-propyl-2-heptanol.
d) 5-ethyl-6,6,7-trimethyl-2-octanol.

16 The correct IUPAC name of $C_6H_5OOCCH_2CH_2CH_3$

a) Propyl benzoate.
b) Butyl benzoate.
c) Phenyl propanoate.
d) Phenyl butanoate.

17 Which of the following compounds remove the red colour of bromine and can react with sodium metal

a) $CH_3CH_2CH_2CH_2OH$.
b) $CH_2=CH_2CH_2CH_2OH$.
c) $CH_2=CH_2CH_2OCH_3$.
d) $C_6H_5CH_2CH_2OH$.

18 What is the number of moles of sodium hydroxide which is required to neutralize 1mol of citric acid?........

a) 1mol
b) 2mol
c) 3mol
d) 4mol

19 Phenyl ethanoate is derived from a reaction of ....

a) acetic acid with ethyl alcohol.
b) benzoic acid with ethanol.
c) ethanoic acid with phenyl group.
d) acetic acid with phenol.

20 Which of the following substances its combustion produces 1 mol of CO_2 gas?

a) 0.25 mol of ethanol.
b) 0.5 mol of ethene.
c) 1 mol of propane.
d) 1.5 mol of graphite.

21 Hydrogenation of the produced compound from reduction of phenol at suitable conditions leads to form ....

a) picric acid.
b) aliphatic compound.
c) phenyl chloride.
d) aromatic compound.

22 (A) and (B) are hydrocarbon derivatives have some mutual properties as
(A) could be used as fuel
(B) participate in preparation of some type of plastic
So (A) and (B) are:

a) (A) alcohol, (B) alkyl halide.
b) (A) phenol, (B) acid.
c) (A) ester, (B) aldehyde.
d) (A) alcohol, (B) phenol.

23 By using the following diagram:

A —(Alkaline hydrolysis)→ B —(Oxidation)→ C

(compound C each mole of it contains 5 mol atoms), So the compounds (A), (B), (C):

a) (A) methyl chloride, (B) methanol, (C) formic acid.
b) (A) ethyl chloride, (B) ethanol, (C) acetic acid.
c) (A) methyl chloride, (B) methanol, (C) formaldehyde.
d) (A) ethyl chloride, (B) ethanol, (C) acetaldehyde.

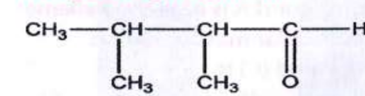
24 You have two compounds (A), (B), compound (A) alkane open chain, its molecular mass 58, and compound (B) saturated monohydric alcohol its molecular mass 60.
Compounds (A) and (B) are..........
(C=12, O=16, H=1)

a) (A) gas, (B) has less boiling point than (A).
b) (A) liquid, (B) has more boiling point than (A).
c) (A) gas, (B) has more boiling point than (A).
d) (A) liquid, (B) has less boiling point than (A).

25 (A) is organic compound and (B) is inorganic compound. By adding compound (C) to compound (A) a violet color appears, while by adding compound (C) to compound (B) a reddish-brown ppt. is formed
Which statement is correct?

a) (B) sodium iodide, (A) acidic salt.
b) (C) acidic salt, (A) basic compound.
c) (B) basic compound, (A) acidic compound.
d) (B) solution of gas in water, (A) liquid substance.

26 Oxidation of the following compound gives.........



a) 2,3-dimethyl propanoic acid.
b) 2,3-dimethyl butanoic acid.
c) 2,3-diethyl butanoic acid.
d) 2,4-diethyl propanoic acid.

27 A, B are organic compounds both of them reacted with NaOH, which of the following is correct?

ⓐ Molecular formula of (A) C_6H_6O, molecular formula of (B) is C_2H_6O.
ⓑ (A) is methyl alcohol, (B) is acetic acid .
ⓒ (A) is isopropyl alcohol, (B) is phenol .
ⓓ Molecular formula of (A) C_6H_6O, molecular formula of (B) is $C_7H_6O_3$.

28 The following reactions to get (A) (B), (C)

$R\text{-}CH_2OH \xrightarrow{\text{strong mineral acid}} A \xrightarrow{\Delta} B$

$\xrightarrow{\text{hydrogenation}} C$

by knowing that (B) applied markonikoff's rule , So A,B,C are:

ⓐ (A) ethyl hydrogen sulphate ,(B) ethene, (C) ethane .
ⓑ (A) ethene, (B) ethyl hydrogen sulphate,(C) ethane.
ⓒ (A) propyl hydrogen sulphate ,(B) propene , (C) propane.
ⓓ (A) propene, ,(B) propane(C) propyl hydrogen sulphate .

29 The molecular formula C_3H_6O may represent ....

ⓐ primary alcohol or ether.
ⓑ secondary alcohol or ketone.
ⓒ aldehyde or ketone.
ⓓ aldehyde or ether.

30 When organic compound (A) reacts with organic compound (B) they produce a compound which has an effective role in treating heart diseases, so (A) & (B) are:

ⓐ (A) terphethalic acid, (B) ethylene glycol.
ⓑ (A) phenol, (B) formaldehyde.
ⓒ (A) phenol, (B) ethylene glycol.
ⓓ (A) glycerol, (B) sulphuric acid.

31 Ester (A) is derived from product of oxidation of toluene, by ammonlysis of that ester produces compound C and B. compound C is aromatic compound and has acidic effect .Which of the following is correct?

ⓐ Compound (A) is phenyl benzoate, (B) is Benzamide .
ⓑ Compound (A) is phenyl benzoate, (B) is Benzyl alcohol .
ⓒ Compound (A) is methyl benzoate, (B) is Benzamide.
ⓓ Compound (A) is methyl benzoate, (B) is Benzyl alcohol .

32 A,B, and C are 3 compounds: on adding (A)to the compound (C) a food flavor is produced, and on adding sodium hydroxide to (B) or (C) a reaction occurs while on adding it to (A) no reaction occurs, then the three compounds are:

ⓐ A: acid, B: phenol, C: alcohol.
ⓑ A: phenol, B: alcohol, C: acid.
ⓒ A: acid, B: alcohol, C: phenol.
ⓓ A: alcohol, B: phenol, C: acid.

33 (A) and (B) are two aromatic organic compounds, the molecular formula of the compound (A) is C_6H_6O,and the compound (B) is $C_7H_6O_3$, so each of the two compounds react with :

ⓐ Ethyl alcohol .
ⓑ Sodium carbonate.
ⓒ Sodium hydroxide.
ⓓ Hydrochloric acid.

34 By using the following diagram:

A $\xrightarrow{\text{Alkaline hydrolysis}}$ B $\xrightarrow{\text{Oxidation}}$ C

(Where one mole of the compound (B) contains 12 moles of atoms) the compounds (A) , (B) and (C) are

ⓐ (A) is 2 - Bromopropane , (B) isopropyl alcohol , (C) is propanoic acid.
ⓑ (A) is 2 - Bromopropane , (B) isopropyl alcohol , (C) is Acetone.
ⓒ (A) is Ethyl chloride , (B) is Ethyl alcohol, (C) is Acetic acid.
ⓓ (A) is Ethyl chloride , (B) is Ethyl alcohol, (C) is Acetaldehyde.

35 The aromatic compound of molecular formula C_8H_{10} can be prepared from reaction of:

ⓐ Methyl chloride with benzene in presence of anhydrous aluminum chloride.
ⓑ Ethyl chloride with benzene in presence of anhydrous aluminum chloride.
ⓒ Heating heptane in presence of platinum.
ⓓ Heating hexane in presence of platinum.

36 The hydrocarbon aliphatic derivative which contains the group (>CH-OH) , reacts with concentrated strong mineral acid to prepare asymmetric alkene , so the alkene is ....

ⓐ ethene .
ⓑ 2- butane .
ⓒ propene.
ⓓ 2-methyl propene.

37 The common name of the compound $(CH_3)_3CCl$ is :

ⓐ Tertiary butyl chloride.
ⓑ Secondary butyl chloride.
ⓒ 2-chloro – 2 – methyl propane.
ⓓ 2- Methyl -2- chloro propane.

38 Primary alcohol can be obtained from secondary alcohol by ....

ⓐ Dehydration / catalytic hydration.
ⓑ Dehydration / addition of HBr / alkaline hydrolysis.
ⓒ Dehydration / halogenation / alkaline hydrolysis.
ⓓ Dehydration / hydrogenation / halogenation / alkaline hydrolysis.

39 Alkaline hydrolysis of an ester its molecular formula $C_3H_6O_2$ may give all the following except ....

ⓐ Ethanol.
ⓑ Methanol.
ⓒ Sodium formate.
ⓓ Sodium propanoate.

40 **Which of the following choices represents obtaining of bromo ethane from sodium ethoxide? ………**

ⓐ Hydrolysis / catalytic hydration / halogenation with bromine water.
ⓑ Hydrolysis / complete oxidation / neutralization / dry distillation / halogenation.
ⓒ Hydrolysis / catalytic hydration / hydrogenation / halogenation.
ⓓ Hydrolysis / dehydration / addition of HBr.

41 **What happens on heating chromic acid with methanol in water bath?……**

ⓐ The color of the solution converted into orange and methanoic acid is formed.
ⓑ The color of the solution converted into green and methanoic acid is formed.
ⓒ The color of the solution converted into orange and methanal is formed.
ⓓ The color of the solution converted into green and methanone is formed.

42 **The general formula for a compound RCH_2OH is similar to the general formula for a compound ……….**

ⓐ R – O – R
ⓑ R – O – Ar
ⓒ Ar – O – Ar
ⓓ Ar – OH

43 **Which group of the following compounds its first member start by two carbon atoms? ………**

ⓐ Alkenes – Alkynes – Cycloalkanes.
ⓑ Alkenes – Ketones – Esters.
ⓒ Alkynes – Esters – Aldehydes.
ⓓ Alkenes – Alkynes – Esters.

44 **Sodium benzoate can be obtained by all the following methods except……….**

ⓐ Acidity test for benzoic acid by sodium bicarbonate.
ⓑ Neutralization of benzoic acid by caustic soda.
ⓒ hydrolysis of methyl benzoate in acidic medium.
ⓓ Alkaline hydrolysis of methyl benzoate in presence of sodium hydroxide.

45 **Which of the following use is right? …………**

ⓐ Sulphuric acid to remove water on esterification of benzoic acid with ethanol.
ⓑ Chloroform in surgical operations nowadays.
ⓒ bromine water to differentiate between propene and propyne gases.
ⓓ Iron III chloride to differentiate between Marookh oil and aspirin.

46 **Formic acid can be obtained from acetic acid by ………**

ⓐ Neutralization / dry distillation / rapid quenching / hydration.
ⓑ Neutralization / dry distillation / halogenation /alkaline hydrolysis.
ⓒ Neutralization / dry distillation / rapid quenching / alkaline hydrolysis / oxidation.
ⓓ Neutralization / dry distillation / halogenation / alkaline hydrolysis / oxidation.

47 **On alkaline hydrolysis of the compound C_3H_7Br which doesn't' contain methylene group, the produced compound is ………**

ⓐ primary alcohol only.
ⓑ secondary alcohol only.
ⓒ primary or secondary alcohol.
ⓓ primary alcohol or tertiary alcohol.

48 **Vanilla is an organic compound has the shown structural formula.**
- What classes does vanilla belong to ? ………..

COOH
(benzene ring) O-CH_3
OH

ⓐ Acid, ester and ether.
ⓑ Acid ester and phenol.
ⓒ Acid, ether and alcohol.
ⓓ Acid, ether and phenol.

49 **What is the correct arrangement of the following processes to obtain picric acid from sodium benzoate? ………**

(1) Nitration (2) Halogenation (3) Alkaline hydrolysis (4) Dry distillation

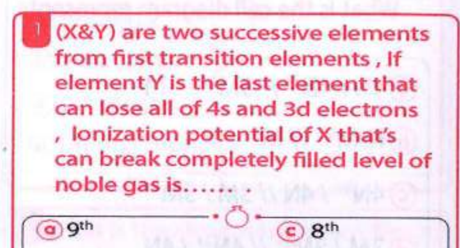
ⓐ (2) / (3) / (4) / (1).
ⓑ (1) / (4) / (2) / (3).
ⓒ (4) / (3) / (2) / (1).
ⓓ (4) / (2) / (3) / (1).

50 **Acidified potassium permanganate is used to differentiate between all the following except…………………**

ⓐ 1 – propanol / 2 – propanol .
ⓑ 1 – butanol / 2 – methyl – 2 – propanol.
ⓒ 1 – butanol / butanoic acid.
ⓓ 2 – pentanol / propanone.

Answers

No.	Answer	No.	Answer
1	B	2	A
3	C	4	D
5	B	6	A
7	D	8	C
9	C	10	D
11	C	12	D
13	C	14	B
15	D	16	D
17	B	18	C
19	D	20	B
21	B	22	D
23	A	24	C
25	C	26	B
27	D	28	C
29	C	30	A
31	A	32	D
33	C	34	B
35	B	36	C
37	A	38	D
39	D	40	D
41	B	42	A
43	D	44	C
45	D	46	D
47	B	48	D
49	D	50	A





1. (X&Y) are two successive elements from first transition elements , If element Y is the last element that can lose all of 4s and 3d electrons , Ionization potential of X that's can break completely filled level of noble gas is.....

ⓐ 9th ⓒ 8th
ⓑ 7th ⓓ 10th

2. Which of the following compounds its heating in air is not a redox reaction?

ⓐ $Fe(OH)_3$ ⓒ $FeSO_4$
ⓑ $FeCO_3$ ⓓ Fe_3O_4

3. On heating magnetic iron oxide with concentrated hydrochloric acid , water vapor is formed and a mixture of compounds (A) , (B) if the number of moles of compound (B) equals half number of moles of water vapor so which of the following statements is incorrect?

ⓐ Compound (A) can be obtained by reaction of iron II oxide with diluted hydrochloric acid .
ⓑ Compound (b) can be obtained by reaction of iron III oxide with diluted hydrochloric acid.
ⓒ Compound (A) can be obtained by reaction of iron II carbonate with diluted hydrochloric acid.
ⓓ Compound (B) can be obtained by passing chlorine gas on red hot iron.

4. which of the following represents the gradual in hardness?

ⓐ Iron and manganese alloy is harder than titanium harder than iron .
ⓑ Iron and magnesium alloy is harder than iron alloy harder than titanium.
ⓒ Titanium is harder than iron and manganese alloy harder than iron.
ⓓ Iron is harder than iron and manganese alloy harder than titanium.

5. Which of the following elements have the same magnetic moment of chromium element?

ⓐ $_{25}Mn$ ⓒ $_{43}Tc$
ⓑ $_{28}Ni$ ⓓ $_{42}Mo$

6. You have three alloys with different uses:

Alloy 1: used in jewellery .
Alloy 2: used in railway track .
Alloy 3: used in plating iron handles.
These alloys are common in:

ⓐ type of alloy.
ⓑ elements forming it.
ⓒ consists of same non-metal.
ⓓ more than one correct.

7. Which columns of elements are called transition elements in modern periodic table?

ⓐ 1 to 2
ⓑ 3 to 10
ⓒ 3 to 11
ⓓ 13 to 18

8. In which of the following cases cations can be separated by adding diluted hydrochloric acid?

ⓐ K^+ / Fe^{2+}.
ⓑ Pb^{2+} / Hg^+.
ⓒ Ba^{2+} / Ca^{2+}.
ⓓ Pb^{2+} / Al^{3+}.

9. On adding lead II acetate solution to the following salt solutions a white ppt is formed in all of them , except ....

ⓐ NaCl
ⓑ NaBr
ⓒ Na_2S
ⓓ Na_2SO_4

10. On adding $(NH_4)_2CO_3$ solution to the solutions which contains .... ions ,white ppt. is not formed.

ⓐ Ba^{2+} ⓒ Sr^{2+}
ⓑ Ca^{2+} ⓓ K^+

11. By adding ammonia solution to two silver precipitates the first which doesn't affected by sunlight and doesn't dissolve, but the second which turns into violet by sunlight which of the following may represent the anions respectively ?

ⓐ I^-, Cl^-.
ⓑ CO_3^{2-}, PO_4^{3-}.
ⓒ CO_3^{2-}, SO_4^{2-}.
ⓓ Cl^-, I^-.

12. Barium chloride solution reacts with salt solutions contain ions of .... And a white ppt is formed .

ⓐ Ca^{2+} / PO_4^{3-}
ⓑ Ag^+ / SO_4^{2-}
ⓒ Pb^{2+} / HCO_3^-
ⓓ Na^+ / NO_3^-

13. On adding starch solution to .... solution its color turns into blue.

ⓐ I^- ⓒ Br^-
ⓑ I_2 ⓓ Br_2

14 The main reagent of nitrite ion and main reagent of nitrate ion can be differentiated by using all the following except ....

ⓐ sodium chloride.
ⓑ sodium iodide.
ⓒ sodium thiosulphate.
ⓓ barium chloride.

15 If you know that 0.25L from benzoic acid solution contains 1.6555×10^{20} of benzoate ions, What is the pH of the solution?

ⓐ 2.69 ⓒ 3.69
ⓑ 2.96 ⓓ 3.93

16 0.015 M of sodium acetate solution has ....

ⓐ pH = 4.69.
ⓑ pOH = 9.42.
ⓒ $[H_3O^+] = 3.45 \times 10^{-9}$ M.
ⓓ $[OH^-] = 4.5 \times 10^{-9}$ M.

17 study the following equation:
$NH_4^+{}_{(aq)} + H_2O_{(l)} \rightleftharpoons NH_{3(g)} + H_3O^+{}_{(aq)}$
The Kc expression is ....

ⓐ $Ka = \frac{[H_3O^+][NH_3]}{[NH_4^+]\ [H_2O]}$
ⓑ $Ka = \frac{[H_3O^+][NH_3]}{[NH_4^+]}$
ⓒ $Kb = \frac{[H_3O^+][NH_3]}{[NH_4^+]\ [H_2O]}$
ⓓ $Kb = \frac{[H_3O^+][NH_3]}{[NH_4^+]}$

18 The isomer of the molecular formula C_4H_9Br which produces from the by alkaline hydrolysis 2-methyl-2-propanol is.......................

ⓐ $CH_3(CH_2)_2CH_2Br$.
ⓑ $CH_3CH(CH_3)CH_2Br$.
ⓒ $(CH_3)_3CBr$.
ⓓ $C_2H_5CHBrCH_3$.

19 If the following reaction takes place in the galvanic cell:
$2Cr_{(s)} + 3Cd^{2+}{}_{(aq)} \rightarrow 2Cr^{3+}{}_{(aq)} + 3Cd_{(s)}$
Which one of the following statements is applied to this cell............

ⓐ the mass of chromium electrode increases.
ⓑ oxidation for ions of chromium electrode takes place.
ⓒ electrons move from cadmium electrode to chromium electrode.
ⓓ the mass of cadmium electrode increases.

20 From the following equations
$Fe^{3+} + e^- \rightarrow Fe^{2+}$ $E^o = 0.77$ volt
$Cu^{2+} + 2e^- \rightarrow Cu$ $E^o = 0.34$volt
Which of the following is not happening by immersing a sheet of copper into iron III ions ?

ⓐ Electrons transfer from copper atoms to iron III ions.
ⓑ Concentration of iron III ions decreased.
ⓒ Concentration of copper II ions decreased.
ⓓ Mass of copper decreased.

21 By passing current in two cells connected in series containing solution of (ZY) & (WX) the produced mass of Z= 1.5 g & mass of X= 2.5 g the equivalent mass of Z=....... where the equivalent mass of X= 9g.

ⓐ 9g ⓒ 5g
ⓑ 15g ⓓ 5.4g

22 Four electrodes W, X, X & Y metals reduction potentials of W = +1, X = -3 & oxidation potentials of Y = +2, Z = -2
All of the following are correct ,except:

ⓐ Metal (X) can replace both (W) ions & hydrogen ions from their solutions.
ⓑ E.M.F. of galvanic cell formed from(X & Y) > (W & Z).
ⓒ We can store solution contains ions of (X) in vessel made of (Y).
ⓓ From these metals strongest reducing agent is (X) & strongest oxidizing agent is (Z) ions.

23 If you know that
M^{4+}/M $E^o = 0.66$ V , N^{3+}/N $E^o = 0.39$ V
What is the cell diagram represents

ⓐ $4N / 4N^{3+} // 3M^{4+} / 3M$
ⓑ $N/M^{3+} // M^{4+} / M$
ⓒ $4N^{3+} / 4N // 3M / 3M^{4+}$
ⓓ $3M / 3M^{4+} // 4N^{3+} / 4N$

24 One of the following changes needs oxidizing agent.........

ⓐ $MnO_4^- \longrightarrow Mn^{2+}$.
ⓑ $NO_3^- \longrightarrow NO$.
ⓒ $S \longrightarrow S^{2-}$.
ⓓ $2Cl^- \longrightarrow Cl_2$.

25 The following ester $CH_3OOCC_6H_5$ can be obtained by a reaction of .....

ⓐ phenol with methanol.
ⓑ phenol with acetic acid.
ⓒ benzoic acid with methanol.
ⓓ benzoic acid with ethanol.

26 which of the following compounds is an isomer of an open chain hydrocarbon that includes four carbon atoms and two pi bond ?

ⓐ Cyclobutane.
ⓑ 1-butyne.
ⓒ 2-butene.
ⓓ Methylpropene.



27 Markownikoff's rule is applied when adding halogenic acid to all the following compounds except ....

ⓐ Propene.
ⓑ 1-butayne.
ⓒ 2-butene.
ⓓ Methyl propene.

28 What is the alcohol which is difficult to be oxidized by normal oxidizing agents from the following?

ⓐ $CH_3CH_2CH_2CH_2OH$
ⓑ $CH_3CH_2CH(OH)CH_3$
ⓒ $(CH_3)_2CHCH_2OH$
ⓓ $(CH_3)_3COH$

29 which of the following statement is incorrect about urea?

ⓐ First organic compound practically can be prepared from inorganic compound.
ⓑ Urea molecule includes 7 sigma bonds and one pi bond.
ⓒ Urea is used as fertilizers to supply plant with its needs from nitrogen and phosphorus.
ⓓ From organic compound which dissolves in water.

30 Which of the following formulae represents 5,3-dimethylhexanal ?

ⓐ $CH_3CH(CH_3)CH_2CH(CH_3)CH_2COOH$.
ⓑ $CH_3CH(CH_3)CH_2CH(CH_3)CHO$.
ⓒ $CH_3CH(CH_3)CH_2CH(CH_3)CH_2CHO$.
ⓓ $CH_3CH(CH_3)CH_2(CH_3)CH_2CHO$.

31 On detection of abuse drivers to alcoholic drinks

ⓐ is oxidized Cr^{3+} ion to Cr^{6+} ion.
ⓑ is oxidized Cr^{6+} ion to Cr^{3+} ion.
ⓒ is reduced Cr^{6+} ion to Cr^{3+} ion.
ⓓ is reduced Cr^{3+} ion to Cr^{6+} ion.

32 To obtain potassium methoxide from methyl iodide

ⓐ by heating with aqueous solution of potassium hydroxide.
ⓑ by heating with aqueous solution of sodium hydroxide then by reacting the product with potassium hydroxide.
ⓒ by heating with aqueous solution of sodium hydroxide then by reacting the product with potassium.
ⓓ by heating with potassium.

33 To obtain 2-pentanone :

ⓐ oxidation of secondary pentyl alcohol.
ⓑ oxidation of iso pentyl alcohol.
ⓒ oxidation tertiary pentyl alcohol.
ⓓ more than one correct.

34 Number of isomers of 1-propanol which doesn't react with Na metal :

ⓐ 0
ⓑ 1
ⓒ 2
ⓓ 3

35 Alkanes , alkenes and alkynes are similar in which of the following :

I) All are open chain hydrocarbons.
II) The number of bonds in each compound increased by 3 bonds from the compound directly before.
III) Each compound its molecular mass increased by 14 u from the compound before .
IV) Number of bonds between carbon atom in its compounds = number of carbon atoms -1 .

ⓐ (I), (II), (III), (IV)
ⓑ (I), (II), (III)
ⓒ (I), (II)
ⓓ (II), (III)

36 Which of the following compounds its molecule contains the largest number of oxygen atoms ?

ⓐ Sorbitol
ⓑ T.N.T
ⓒ The compound used as antiseptic for the treatment of burns.
ⓓ The produced compound from reaction in nitration condition with 1 ,2 ,3 trihydroxy propane.

37 In the following reaction:

$$2SO_{2(g)} + O_{2(g)} \xrightarrow{450^oC/V_2O_5} 2SO_{3(g)}$$

The role of vanadium pentaoxide (V_2O_5) in the reaction..............

ⓐ decreases the rate of chemical reaction .
ⓑ decreases the heat content of SO_3.
ⓒ increases the change of heat content of the reaction .
ⓓ decreases the activation energy of the reactant molecules .

38 To obtain benzoic acid from saturated open chain hydrocarbon contains the same number of carbon in acid , the reactions will be .... respectively .

ⓐ catalytic reforming – alkylation – oxidation
ⓑ catalytic reforming – oxidation
ⓒ rapid quenching – polymerization – alkylation – oxidation
ⓓ hydrolysis – complete oxidation

39 Which of the following compounds don't need any number within nomenclature in IUPAC system ?

ⓐ $CH_3CH=CHCH_3$
ⓑ $CH_3COCH_2CH_3$
ⓒ $CH_3CHBrCH_2CH_3$
ⓓ $CH_3CHClCH_2CH_2Cl$

40 Which of the following preparation reactions of methanol is easier to take place?...

ⓐ $CH_3Cl_{(g)} + NaOH_{(aq)} \xrightarrow{\Delta} CH_3OH_{(aq)} + NaCl_{(aq)}$
ⓑ $CH_3Br_{(g)} + NaOH_{(aq)} \xrightarrow{\Delta} CH_3OH_{(aq)} + NaBr_{(aq)}$
ⓒ $CH_3I_{(g)} + NaOH_{(aq)} \xrightarrow{\Delta} CH_3OH_{(aq)} + NaI_{(aq)}$
ⓓ all of them have same rate

41 In the following reaction :
$CH_3CH_2Br + NH_3 \xrightarrow{\Delta/p} (A) + HBr$
The name of compound (A) is ....

- ⓐ acetamide
- ⓑ nitro ethane
- ⓒ ethyl amine
- ⓓ urea

42 The compound which reacts by substitution and doesn't react by addition is ....

- ⓐ C_6H_6
- ⓑ CH_4
- ⓒ C_2H_4
- ⓓ C_2H_2

43 Iron III chloride can be obtained from siderite through the following process ....

- ⓐ thermal decomposition / neutralization with hot conc. HCl acid .
- ⓑ roasting / reduction above 700 C / directly combination with Cl_2.
- ⓒ thermal decomposition / reduction above 700 C / directly combination with Cl_2.
- ⓓ more than one is correct .

44 What's the volume of 4 mol/L nitric acid needed to produce 200ml of 0.5 mol/L of the same acid?

- ⓐ 225ml
- ⓑ 25ml
- ⓒ 175m
- ⓓ 40ml

45 The substance when dissolves in water gives electrolytic solution ....

- ⓐ H_2 gas
- ⓑ NaOH
- ⓒ oil
- ⓓ glucose

46 In the equilibrium reaction:
$AgCl_{(s)} \rightleftharpoons Ag^+_{(aq)} + Cl^-_{(aq)}$
On adding 0.1 mol/L ammonia solution to the previous reaction shifts toward.....................

- ⓐ forward direction and concentration of silver ions decreases .
- ⓑ backward direction and concentration of silver ions decreases .
- ⓒ forward direction and increase the solubility of ppt.
- ⓓ backward direction and concentration of silver ions increases .

47 0.01 M hydrochloric acid solution its pOH equal...............

- ⓐ 1
- ⓑ 0
- ⓒ 2
- ⓓ 12

48 The pH of ammonium carbonate more than 7 and pH of ammonium acetate equal 7 so.................

- ⓐ acetic acid stronger than carbonic acid.
- ⓑ acetic acid weaker than carbonic acid.
- ⓒ the hydrolysis of acetate ions doesn't take place in the solution.
- ⓓ the hydrolysis of ammonium ions doesn't take place in the solution.

49 Chemical equilirbium achieved when ....

- ⓐ The concentrations of reactants and products became equal and the rate of two opposite directions became different.
- ⓑ The masses of reactants and products became equal and the rate of two opposite directions became equal .
- ⓒ The concentrations of reactants and products remain constant and the rate of two opposite directions became different.
- ⓓ The concentrations of reactants and products remain constant and the rate of two opposite directions became equals.

50 What happened to the mass of anode and the mass of cathode during electrolysis of copper II sulphate between two graphite rods? ....

- ⓐ The mass of anode increased while the mass of cathode decreased.
- ⓑ The mass of anode decreased while the mass of cathode remains constant.
- ⓒ The mass of anode remains constant while the mass of cathode increased.
- ⓓ The mass of anode decreased and the mass of cathode increased.

Answers

No.	Answer	No.	Answer
1	B	2	A
3	B	4	A
5	D	6	A
7	C	8	D
9	C	10	D
11	A	12	B
13	B	14	C
15	B	16	C
17	B	18	C
19	D	20	C
21	D	22	B
23	A	24	D
25	C	26	B
27	C	28	D
29	C	30	C
31	C	32	C
33	A	34	B
35	B	36	D
37	D	38	B
39	B	40	C
41	C	42	B
43	D	44	B
45	B	46	C
47	D	48	A
49	D	50	C



1 The element which its configuration ends with 4d ↿ ↿ ↿ ↿ ↿ , 5s ↿ is located in:

ⓐ group 6B & 6^{th} period.
ⓑ group 5B & 4^{th} period.
ⓒ group 6B & 5^{th} period.
ⓓ group 5B & 5^{th} period.

2 what is the number of electrons in copper ion in $Cu_3(OH)_2(SO_4)_2$?

ⓐ 29 ⓒ 27
ⓑ 28 ⓓ 26

3 If you know that third ionization potential of iron metal is 2956 KJ/ mol, so the third ionization potential of Manganese is ....

ⓐ 2389 KJ/ mol
ⓑ 2500 KJ/ mol
ⓒ 3250 KJ/ mol
ⓓ 2830 KJ/ mol

4 The correct steps to convert siderite ore into black magnetic iron oxide are ......

ⓐ roasting / oxidation.
ⓑ heating in absence of air / reduction above 700°C.
ⓒ thermal decomposition / oxidation / reduction at 500°C.
ⓓ thermal decomposition / oxidation / reduction at 250°C.

5 Which of the following elements never has an ion with electronic configuration $[_{18}Ar]$, $3d^5$?

ⓐ Mn ⓒ Ni
ⓑ Co ⓓ Fe

6 2.28g from mixture of NaCl and $CaCl_2$ was dissolved in water then added to excess of silver nitrate solution so a 5.74g of silver chloride precipitated which of the following is correct?
[Na=23, Ca=40, Cl=35.5, Ag=108]

Choice	Mass of NaCl	Mass of $CaCl_2$	% of NaCl in mixture
(a)	1.17g	1.11g	51.3%
(b)	1.17g	1.17g	48.7%
(c)	2.11g	1.11g	92.5%
(d)	1.11g	1.11g	51.3%

7 With which of the following no precipitate is formed when adding sodium carbonate solution to its solution?

ⓐ $Ba(NO_3)_2$ ⓒ $MgSO_4$
ⓑ $CaCl_2$ ⓓ NH_4Cl

8 Which pairs of cations can't be separated on adding sodium carbonate solution?

ⓐ K^+/ Ba^{2+} ⓒ Pb^{2+} / Ca^{2+}
ⓑ Na^+/ Ca^{2+} ⓓ Ag^+ / NH_4^+

9 Which of the following is a sparingly soluble salt?

ⓐ $FeSO_4$ ⓒ $PbCl_2$
ⓑ CH_3COONa ⓓ CH_3COOK

10 What is the P^H value for 0.1M of monoprotic weak acid it's degree of ionization equals 0.0372?

ⓐ 2.43 ⓒ 5.43
ⓑ 0.43 ⓓ 4.43

11 Which of the following values represents concentration of hydronium ion in solution of 0.02M of monoprotic weak acid?

ⓐ $1 X 10^{-7}$M
ⓑ 1 M
ⓒ $6.6 X 10^{8}$ M
ⓓ $1.1 X 10^{-3}$ M

12 Iron rusting is electrochemical process in which ....

ⓐ Fe is oxidized into Fe^{3+} and water is reduced into OH^-.
ⓑ Fe is oxidized to Fe^{2+} and water is reduced to OH^-.
ⓒ Fe is oxidized into Fe^{3+} and oxygen dissolved in water is reduced to OH^-
ⓓ oxidation of Fe to Fe^{3+} and water is reduced to O^2.

13 We can use Copper metal to differentiate between each pair of solutions except:

ⓐ $AgNO_{3(aq)}$ / $Zn(NO_3)_{2(aq)}$
ⓑ $H_2SO_{4(aq)}$ / $HNO_{3(l)}$
ⓒ $H_2SO_{4(aq)}$ / $HCl_{(aq)}$
ⓓ $HCl_{(aq)}$ / $HNO_{3(l)}$

14 By passing hydrogen sulphide gas in acidified copper ions solution by hydrochloric acid ....

ⓐ a black ppt is formed.
ⓑ a white ppt is formed.
ⓒ a yellow ppt is formed.
ⓓ no ppt is formed.

15 By passing a current with intensity of 5 A in 6 minutes in an electrolytic cell contain ions of metal X , $3.743x10^{21}$ atom precipitated, what is the oxidation state of X ions ?

ⓐ +1 ⓒ +3
ⓑ +2 ⓓ +4

16 By connecting acid-car battery by outer source of electricity its voltage is little higher than battery voltage, all the following occur except

ⓐ mass of lead II sulphate decreases.
ⓑ mass of water decreases.
ⓒ P^{H} value increases .
ⓓ P^{OH} value increases .

17 Calculate volume of oxygen gas at S.T.P Which is produced by passing 2.107 X 10^{24} electrons in an electrolytic cell of water acidified with dil. acid?

ⓐ 78.4L ⓒ 19.6L
ⓑ 156.8L ⓓ 39.2L

18 Which of the following compounds is derived from combination of isobutyl group with tertiary butyl group?

ⓐ 2,2,4- trimethyl pentane
ⓑ 2,2,3-trimethyl pentane
ⓒ 2,2,3- trimethyl butane
ⓓ 2,5- dimethyl hexane

19 Which of the following methods can't produce the following compound CH_3COOCH_3 or its isomers?

ⓐ acidic hydrolysis of phenyl propanoate.
ⓑ reaction of acidified potassium permanganate with propanal.
ⓒ reaction of formic acid with ethanol in presence of dehydrating agent.
ⓓ reaction of acetic acid with ethanol in presence of dehydrating agent.

20 No of isomers of compound $C_3H_6Cl_2$ which contains 3 methylene group?

ⓐ 1 ⓒ 3
ⓑ 2 ⓓ 4

21 which of the following is a continuous chain?

(I)	(II)	(III)
$CH_3CH_2CH_2CH_2CH_3$	$CH(CH_3)_2CH_2CH_3$	$C(CH_3)_4$

ⓐ (I) ⓒ (I) , (III)
ⓑ (I) , (II) ⓓ (I) , (II) , (III)

22 which of the following homologous series is the same in the general formula ?

(I)	(II)	(III)	(IV)
Alkanes	Alkenes	Alkynes	Cycloal-kanes

ⓐ I , II , III , Iv ⓒ II , IV
ⓑ I , IV ⓓ II , III

23 Number of aromatic isomers of a dibasic aromatic acid that don't include ester group is

ⓐ 0 ⓒ 2
ⓑ 1 ⓓ 3

24 The number of methylene groups are equal in all the following compounds except ....

ⓐ pentane .
ⓑ 1-hexyne.
ⓒ methyl -cyclobutane.
ⓓ ethyl – cyclobutane .

25 The correct IUPAC name of a compound 1,1,2-trimethyl – ethene is

ⓐ 3-methyl-2-butene.
ⓑ 2-methyl-2-butene.
ⓒ 2-methyl-1-butene.
ⓓ 3-methyl-1-butene.

26 Which of the following produces tertiary pentyl alcohol by catalytic hydration?

(I)	(II)	(III)	(IV)
2-meth-yl-2-pen-tene	2-meth-yl-2-bu-tene	2-meth-yl-1-bu-tene	3-meth-yl-1-bu-tene

ⓐ (I), (II), (III), (IV) ⓒ (I), (II), (III)
ⓑ (II), (III), (IV) ⓓ (II), (III)

27 Which of the following can react with hydrochloric acid and sodium hydroxide?

(I)	(II)	(III)	(IV)
Citric acid	Terphe-thalic acid	Lactic acid	Carbolic acid

ⓐ (I), (II), (III), (IV) ⓒ (II), (VI)
ⓑ (II), (IV) ⓓ (I), (III)

28 The molecular formula for propyl amine is ....

ⓐ C_3H_9N ⓒ $C_3H_{10}N$
ⓑ C_3H_8N ⓓ C_3H_7N

29 When heating iron with Sulphur then dissolved the product in dil. HCl then adding ammonium hydroxide ......

ⓐ greenish white ppt. is formed .
ⓑ reddish brown ppt. is formed.
ⓒ gas has a pungent odor is evolved .
ⓓ white ppt. is formed which dissolved in excess of ammonium hydroxide.

30 Which of the following process increases the percentage of iron in its ore?

ⓐ crushing – sintering .
ⓑ concentrating – crushing.
ⓒ roasting - concentrating.
ⓓ sintering- roasting.



31 The number of transition elements in the first, second, third transition series equal ………. Element

ⓐ 25 ⓒ 29
ⓑ 27 ⓓ 30

32 If the formula of hydrated copper sulphate is $CuSO_4.5H_2O$, So the mass of anhydrate copper sulphate ($CuSO_4$) in 200g of hydrated copper sulphate(Cu=63.5,S=32,O=16,H=1)

ⓐ 64g ⓒ 128g
ⓑ 72g ⓓ 144g

33 When 5.3 g of sodium carbonate dissolved in 0.5L of pure water, then 50ml of it neutralized with 10ml of hydrochloric acid, so the concentration of acid equal ……….
[Na=23, Cl=35.5 ,C=12]

ⓐ 0.1M ⓒ 0.2M
ⓑ 1M ⓓ 0.5M

34 The following table shows the change in temperature and K_p value for the following chemical equilibrium

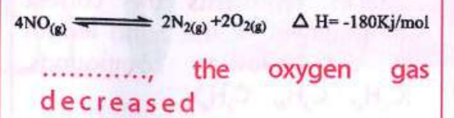
$$N_{2(g)}+O_{2(g)} \rightleftharpoons 2NO_{(g)}$$

T(°C)	KP
25	$4x10^{-33}$
427	$5x10^{-13}$
827	$4x10^{-8}$
1227	$1x10^{-5}$

Which of the following is correct?

ⓐ the decomposition of $NO_{(g)}$ is endothermic .
ⓑ decomposition of $NO_{(g)}$ increased by heating .
ⓒ the reaction shifted forward by heating.
ⓓ K_p for decomposition of $NO_{(g)}$ is smaller than K_p for formation of $NO_{(g)}$.

35 In the following equation:



$$4NO_{(g)} \rightleftharpoons 2N_{2(g)}+2O_{2(g)} \quad \Delta H=-180Kj/mol$$

…………, the oxygen gas decreased

ⓐ by adding nitric oxide.
ⓑ by increasing pressure.
ⓒ by heating the reaction.
ⓓ by cooling the reaction.

36 The equilibrium constant for reaction between hydrogen and oxygen to produce water is very high ($Kc=2.1x10^{22}$) at 1000°C so the reaction at equilibrium, ……….

ⓐ rate of forward is more than rate of backward .
ⓑ rate of backward is more than rate of forward .
ⓒ rate of backward equal rate of forward.
ⓓ there is no relation between rate of backward and rate of forward.

37 In the following equilibrium

$$N_{2(g)}+O_{2(g)} \rightleftharpoons 2NO_{(g)}\text{-heat}$$

the concentration of NO increased by ……..

ⓐ decreasing quantity of O_2 .
ⓑ increasing temperature .
ⓒ increasing pressure .
ⓓ decreasing quantity of N_2.

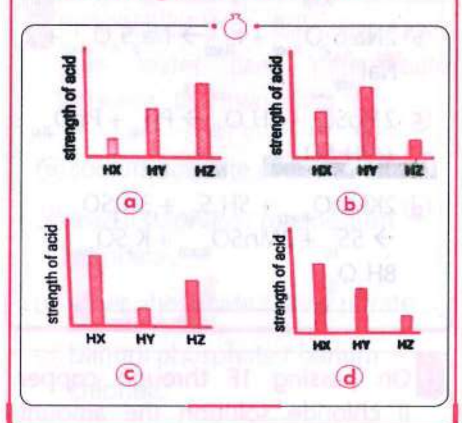
38 In the following equilibrium

$$BaSO_{4(s)} \rightleftharpoons Ba^{2+}_{(aq)} + SO_4^{2-}{}_{(aq)}$$

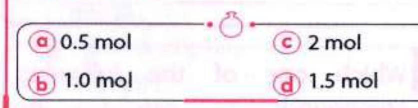
what will happen when adding H_2SO_4 ?

ⓐ $[Ba^{2+}]$will increase.
ⓑ $[Ba^{2+}]$will decrease.
ⓒ K_{sp} will increase .
ⓓ the equilibrium not affected .

39 Three different salt solutions have the same concentration 1M are: NaX, NaY and NaZ, the value of p^H respectively 7, 9 and 11, which one of the following graphs represents the strength of their acids.



40 On passing 1 faraday through a solution contains chloride ions the number of moles of evolved chlorine gas equal………..
[Cl=35.5]



ⓐ 0.5 mol ⓒ 2 mol
ⓑ 1.0 mol ⓓ 1.5 mol

41 By knowing the E^0 of the following:

$2M^0_{(s)} + 3Zn^{2+}_{(aq)} \rightarrow 2M^{3+}_{(aq)} + 3Zn^0_{(s)}$; $E^0=+0.9V$

$Zn^{2+}_{(aq)} + 2e^- \rightarrow Zn^0_{(s)}$; $E^0=-0.76V$

So the value of E0 of the following reaction equal………………

$$M^{3+}_{(aq)} + 3e^- \rightarrow M^0_{(s)}$$

ⓐ +1.66V ⓒ +0.14V
ⓑ -1.66V ⓓ -0.62V

42 All the following are salt bridge functions in the galvanic cell except………………

ⓐ allows the transfer of anions toward the anode half cell .
ⓑ neutralizes the excess of anions in the cathode half cell .
ⓒ participates in oxidation and reduction reactions.
ⓓ prevents the direct connection between the solutions in two half cells and keep the neutralization in the halves cell.

43 Which of the following reactions is the oxidizing agent the same as reducing agent ?

ⓐ $CuSO_{4(aq)} + Zn_{(s)} \rightarrow Cu_{(s)} + ZnSO_{4(aq)}$

ⓑ $2Na_2S_2O_{3(aq)} + I_{2(aq)} \rightarrow Na_2S_4O_{6(aq)} + 2NaI_{(aq)}$

ⓒ $2PbSO_4 + 2H_2O_{(l)} \rightarrow Pb_{(s)} + PbO_{2(s)} + 2H_2SO_{4(aq)}$

ⓓ $2KMnO_{4(aq)} + 5H_2S_{(g)} + 3H_2SO_{4(aq)} \rightarrow 5S_{(s)} + 2MnSO_{4(aq)} + K_2SO_{4(aq)} + 8H_2O_{(l)}$

44 On passing 1F through copper II chloride solution the amount of evolved chlorine gas at STP equal..........

ⓐ 8.4 L
ⓑ 33.6 L
ⓒ 22.4 L
ⓓ 11.2 L

45 Which one of the following compounds can be oxidized........................

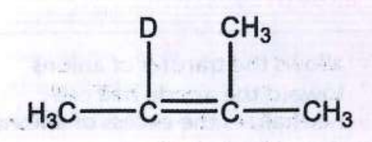
ⓐ C_6H_5COOH

ⓑ $C_6H_4(COOH)_2$

ⓒ $CH_3C(CH_3)(OH)CH_3$

ⓓ $CH_2OH(CH_2)CH_3$

46 The reaction of the following compound with hydrobromic acid produces 2-bromo-2-methylbutane, so (D) represents......................



ⓐ Br atom.

ⓑ CH_3 group .

ⓒ C_2H_5 group .

ⓓ H atom.

47 Which one of the following choices represents the correct arrangement of the bond length of the following compounds. (C_6H_6, C_2H_6, C_2H_4)

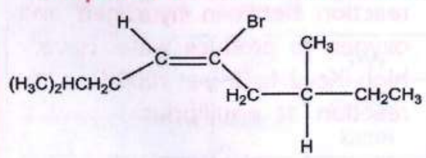
ⓐ $C_2H_6 > C_2H_4 > C_6H_6$

ⓑ $C_2H_4 > C_2H_6 > C_6H_6$

ⓒ $C_2H_6 > C_6H_6 > C_2H_4$

ⓓ $C_6H_6 > C_2H_4 > C_2H_6$

48 The IUPAC name of the following compound is..............................



ⓐ 5-bromo-2,7-dimethyl-4-nonene

ⓑ 5-bromo-3,8-dimethyl-5-nonene

ⓒ 5-bromo-3-methyl-5-decene

ⓓ 6-bromo-8-methyl-5-decene

49 On oxidation of primary alcohol the molecular formula of the produced acid compared to alcohol it changes as...........

Choice	C atom	H atom	O atom
(a)	No change	No change	Increases
(b)	No change	Decreases	Increases
(c)	No change	Decreases	Decreases
(d)	No change	Increases	Decreases

50 By replacing hydrogen atom in ethene by alkyl group then polymerized the produced compound, this polymer used in..........................

ⓐ shoes and hoses .

ⓑ plastic bottles .

ⓒ layering cooking utensils .

ⓓ mattresses.

Answers

No.	Answer	No.	Answer
1	C	2	C
3	C	4	A
5	C	6	A
7	D	8	C
9	C	10	A
11	D	12	C
13	C	14	A
15	C	16	C
17	C	18	A
19	D	20	A
21	A	22	C
23	D	24	D
25	B	26	D
27	D	28	A
29	A	30	C
31	B	32	C
33	B	34	C
35	C	36	C
37	B	38	B
39	D	40	A
41	B	42	C
43	C	44	D
45	D	46	D
47	C	48	A
49	B	50	D

Model exam - 3

1. Iron II carbide is the chemical name of compound .....
   - (a) cementite.
   - (b) siderite.
   - (c) magnetite.
   - (d) hematite.

2. The number of f sublevel/s in gold atom equal.............
   - (a) zero
   - (b) 1
   - (c) 2
   - (d) 4

3. In the following reaction:
   $$A + B \rightleftharpoons C + D$$
   By knowing the activation energy of forward reaction is 140 KJ/mol and the activation energy of backward reaction is 90 KJ/mol so it's:
   - (a) endothermic reaction and the value of ΔH= -50 .
   - (b) endothermic reaction and the value of ΔH= +50 .
   - (c) exothermic reaction and the value of ΔH= -50 .
   - (d) exothermic reaction and the value of ΔH= +50 .

4. The electronic configuration of cobalt ion in $[CoF_6]^{2-}$ similar to the electronic configuration of all the following except:
   - (a) cobalt II ion .
   - (b) cobalt IV ion.
   - (c) iron III ion .
   - (d) manganese II ion.

5. Which one of the following reactions isn't accompanied by gas evolving ....
   - (a) diluted hydrochloric acid + iron II carbonate .
   - (b) diluted hydrochloric acid + iron II sulphide .
   - (c) diluted hydrochloric acid + iron II hydroxide .
   - (d) diluted hydrochloric acid + iron filings.

6. In the following reaction:
   $$2H_2O_2 \rightarrow 2H_2O + O_2$$
   On adding small amount of manganese dioxide to the reaction increases:
   - (a) released energy .
   - (b) reactants energy .
   - (c) products energy .
   - (d) mass of H_2O_2 that decomposed in a unit time.

7. From the following reactions:
   $Ni_{(g)} \rightarrow Ni^+_{(g)} + e^-$ $\Delta H_1 = +$ KJ/mol
   $Ti_{(g)} \rightarrow Ti^+_{(g)} + e^-$ $\Delta H_2 = +$ KJ/mol
   $Mn_{(g)} \rightarrow Mn^+_{(g)} + e^-$ $\Delta H_3 = +$ KJ/mol
   $Sc_{(g)} \rightarrow Sc^+_{(g)} + e^-$ $\Delta H_4 = +$ KJ/mol
   Choose the ΔH of the highest value:
   - (a) ΔH_1
   - (b) ΔH_2
   - (c) ΔH_3
   - (d) ΔH_4

8. All the following pair of ions on mixing with each other produces a sparingly soluble salt in water but soluble in ammonium hydroxide except:
   - (a) Ag^+ , Cl^-
   - (b) Ag^+ , PO_4^{3-}
   - (c) Ag^+ , Br^-
   - (d) Ag^+ , I^-

9. In which of the following cases pure water can't differentiate between the two salts ?
   - (a) sodium sulphite / sodium nitrite.
   - (b) lead II sulphate / magnesium sulphate .
   - (c) silver phosphate / silver nitrate.
   - (d) barium phosphate / barium chloride.

10. Diluted hydrochloric acid can't differentiate between.
    - (a) sodium carbonate / sodium nitrite .
    - (b) sodium sulphite / sodium sulphate .
    - (c) sodium phosphate / sodium sulphate .
    - (d) barium phosphate / barium sulphate.

11. The color of acidified potassium permanganate can be removed by adding it to the solution :
    - (a) KNO_2 / Na_2SO_3 / $FeSO_4$
    - (b) KNO_2 / Na_2SO_4 / $FeSO_4$
    - (c) KNO_3 / Na_2SO_3 / $FeSO_4$
    - (d) KNO_2 / Na_2SO_3 / $Fe_2(SO_4)_3$

12. The volume of water which is added to 200ml from 0.3 M sodium hydroxide to convert it to solution it concentration 0.1 M equal
    - (a) 600 ml
    - (b) 400 ml
    - (c) 40 ml
    - (d) 60 ml

13 By adding excess of sodium hydroxide solution to solution (x) gelatinous reddish brown precipitate is formed, then separate the precipitate by filtration then adding barium chloride white ppt. is formed so which of the following salts represent solution (X) ?

ⓐ iron III nitate.
ⓑ iron III sulphate.
ⓒ iron III carbonate.
ⓓ iron II sulphate.

14 By mixing 150ml of 0.4M of potassium carbonate with 200ml of 0.5M of potassium carbonate so what is the concentration of potassium ions in the resulting mixture ?

ⓐ 0.45M ⓒ 0.457M
ⓑ 0.812M ⓓ 0.914M

15 Which of the following can form solution with p^H less than 7?

ⓐ produced solution from mixing 25ml of 0.15m oxalic acid $H_2C_2O_4$ with 25ml of 0.3M of NaOH .
ⓑ produced solution from mixing 15ml of 0.05 formic acid HCOOH with 15ml of 0.05M of KOH.
ⓒ produced solution from mixing 25ml of 0.45M sulphuric acid with 25ml of 0.9M NaOH .
ⓓ produced solution from mixing 75ml of 0.4M nitric acid with 150ml of 0.2M of NH4OH .

16 The solubility product of salt ....Equal multiplication of concentration of cations x (concentration of anions $)^2$.

ⓐ AgBr ⓒ Ag_2SO_4
ⓑ CaF_2 ⓓ $Al_2(CO_3)_3$

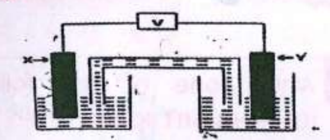
17 According to the following redox reaction :

$$Cu_{(s)} + 4HNO_{3(aq)} \rightarrow 2H_2O_{(l)} + 2NO_{2(g)} + Cu(NO_3)_{2(aq)}$$

All the following are correct except :

ⓐ nitric acid acts as oxidizing agent.
ⓑ product of the reduction reaction is $Cu(NO_3)_2$.
ⓒ each copper atom loses 2 electrons.
ⓓ copper reduce nitric acid .

18 Write the cell diagram of the following galvanic cell knowing that the mass of pole X increase by time



ⓐ $Y_{(s)} / Y^{2+}_{(aq)} // 2X^{+}_{(aq)} / 2X_{(s)}$
ⓑ $2X_{(s)} / 2X^{+}_{(aq)} // Y^{2+}_{(aq)} / Y_{(s)}$
ⓒ $Y^{2+}_{(aq)} / Y_{(s)} / 2X_{(s)} / 2X^{+}_{(aq)}$
ⓓ $2X^{+}_{(aq)} / 2X_{(s)} / Y_{(s)} / Y^{2+}_{(aq)}$

19 Which of the following is correct ?

ⓐ Silver atoms can be oxidized by Cu^{2+} ions .
ⓑ In a galvanic cell the oxidizing agent in a cell reaction is found in the anode half of the cell .
ⓒ In a galvanic cell whose electrodes are aluminum and magnesium ,the aluminum is anode.
ⓓ In a galvanic cell the direction of movement of negative ions across the bridge is opposite to the direction of electrons in the wire.

20 Catalytic hydration of the simplest alkene produces W , simplest asymmetric alkene produces X , simplest alkyne produces Y and the simplest asymmetric alkyne produces Z so the compounds W,X,Y & Z respectively are ....

ⓐ ethanol – 2-propanol – acetaldehyde – acetone .
ⓑ acetone – 2-propanol – acetaldehyde – ethanol .
ⓒ ethanol – acetaldehyde – acetone – 2-propanol .
ⓓ 2-propanol – ethanol – acetaldehyde – acetone.

21 What is the mass of potassium which reacts with an excess of methanol to obtain 11.2L of hydrogen gas at STP? [K=39]

ⓐ 39g ⓒ 7.8g
ⓑ 19.5g ⓓ 78g

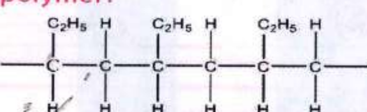
22 Which of the following is considered as tertiary alkyl halide?

ⓐ $CHBr_3$
ⓑ $CH_3CH_2CH_2Br$
ⓒ $(CH_3)_2CHCHBrCH_3$
ⓓ $(CH_3)_2CBrCH_2CH_3$

23 Which of the following compounds can't reduce acidified $K_2Cr_2O_7$ by concentrated sulphuric acid?

ⓐ HCHO ⓒ SO_2
ⓑ CH_3CH_2OH ⓓ $(CH_3)_2CO$

24 The opposite structure illustrates a part of polymer ... What is the monomer used to prepare that polymer?



ⓐ Propene
ⓑ 1-Butene
ⓒ 2-Butene
ⓓ 2-Methyl propene

25 A molecule of iron II formate has .... more than iron II oxalate molecule

ⓐ one hydrogen atom.
ⓑ two hydrogen atoms.
ⓒ one carbon and two hydrogen atoms .
ⓓ one carbon and three hydrogen atoms.

26 When 1 mole (2,2 – dimethyl propane) reacts with 1mole of Cl_2 gas in presence of UV it produced 1 mole of compound (A) that by heating with aqueous solution potassium hydroxide will form :

ⓐ hydrocarbon derivatives oxidized by acidified $KMnO_4$ in one step to form ketone .
ⓑ hydrocarbon derivatives oxidized by acidified $KMnO_4$ in one step to form acid.
ⓒ hydrocarbon derivatives oxidized by acidified $KMnO_4$ in two steps to form acid.
ⓓ hydrocarbon derivatives not oxidized by acidified $KMnO_4$.

27 On complete combustion of .... the number of moles of CO_2 produced is equal to number of H_2O molecules.

ⓐ alkane
ⓑ alkene
ⓒ alkyne
ⓓ aromatic hydrocarbon

28 Which of the following molecules has 17 sigma bonds and 1 pi bond?

ⓐ 2,3-dimethyl butane.
ⓑ 3,3- dimethyl -1-butyne.
ⓒ 3,3- dimethyl -1-butene.
ⓓ 2,3-dimethyl pentene.

29 The IUPAC name of isobutyl alcohol is ....

ⓐ 2-butanol.
ⓑ 1-butanol.
ⓒ 2-methyl-1-propanol.
ⓓ 2-methyl-2-propanol.

30 Which of the following compounds can't be obtained from primary alcohol directly?

ⓐ CH_3CH_2COOH
ⓑ CH_3CHCH_2
ⓒ CH_3OCH_3
ⓓ $CH_3CH_2CH_3$

31 All the following represent isomers of C_4H_8O except

ⓐ butanal
ⓑ butanone
ⓒ methyl propyl ether
ⓓ 2-methyl propanal

32 Which of the following is correct to convert 2-propanol to 1-propanol.

ⓐ dehydration- adding HBr- alkaline hydrolysis.
ⓑ dehydration- hydrogenation- halogenation by substitution- alkaline hydrolysis.
ⓒ dehydration- adding Br2- alkaline hydrolysis.
ⓓ dehydration- halogenation by substitution- hydrogenation- alkaline hydrolysis.

33 What is mass of bromine which is required for the reaction with 13g of ethyne to obtain a compound each molecule of it contains five sigma bonds? [Br=80 C=12 H=1]

ⓐ 320g
ⓑ 160g
ⓒ 80g
ⓓ 40g

34 All the following compounds are produced from the reaction of potassium permanganate in alkaline medium with alkene except..............

ⓐ 1,2-dihyroxypropane
ⓑ 1,2-dihydroxybutane
ⓒ 2,3-dihydroxybutane
ⓓ 1,3-dihydrxybutane

35 what's the similarity between the monomer and its polymer which is produced by addition?

ⓐ boiling point
ⓑ molar mass
ⓒ density
ⓓ empirical formula

36 If the strength of bond (C – Br) equal 290 KJ/mol so the the strength of bond (C – I) equal .... KJ / mol

ⓐ 467
ⓑ 346
ⓒ 290
ⓓ 228

37 The following reactions happen to detect the acidic radicals of salt A and B.

1) $A_{(s)} + HCl_{(aq)} \rightarrow B_{(aq)} + CO_{2(g)} + H_2O_{(l)}$

2) $2B_{(s)} + H_2SO_{4(l)} \rightarrow Na_2SO_{4(aq)} + C_{(g)}$

Which of the following is correct?

ⓐ salt A is sodium bicarbonate and gas C is hydrogen chloride.
ⓑ salt B is sodium carbonate and gas C is hydrogen chloride.
ⓒ salt A is sodium carbonate and gas C is hydrogen chloride.
ⓓ salt B is solid in the two equations.

38 To obtain 2-pentanone :

ⓐ oxidation of secondary pentyl alcohol.
ⓑ oxidation of isopentyl alcohol.
ⓒ oxidation tertiary pentyl alcohol.
ⓓ more than one correct.

39 Which of the following is solubility product for calcium phosphate salt $Ca_3(PO_4)_2$?

ⓐ $K_{sp} = [Ca^{2+}]^2[PO_4^{3-}]^3$
ⓑ $K_{sp} = \frac{(Ca^{2+}]^3[PO_4^{3-}]^2}{[Ca_3(PO_4)_2]}$
ⓒ $K_{sp} = [Ca^{2+}]^3[PO_4^{3-}]^2$
ⓓ $K_{sp} = [Ca^{3+}]^2 + [PO_4^{2-}]^3$

40 When heating the solid substance (X) in closed vessel gases products are formed through endothermic reversible reaction so, you can increase the amount of products from ....

ⓐ increasing pressure.
ⓑ decreasing temperature.
ⓒ adding another amount from reactants.
ⓓ decreasing pressure.

41 When mixing two equal amounts of KCl solution and KOH solution

ⓐ P^{KW} increases.
ⓑ P^{H} of KOH decreases .
ⓒ P^{OH} of KOH decreases .
ⓓ P^{H} of KOH isn't change .

42 The concentration of hydroxyl ions of solution is 0.001 M, so the concentration of the hydrogen ion in the solution is .....

ⓐ 10^{-3} ⓒ 10^{-11}
ⓑ 10^{3} ⓓ 10^{-14}

43 If you know the degree of ionization of monoprotic acid is 0.024 and the ionization constant is 1.442×10^{-4} so, the concentration of acid is.....

ⓐ 0.25 ⓒ 0.5
ⓑ 6×10^{-3} ⓓ 3.45×10^{-6}

44 By electrolysis molten of lead II bromide, which of the following is correct?

ⓐ a colorless gas is evolved at cathode.
ⓑ atoms of metal are precipitated at anode.
ⓒ orange vapor is evolved at anode .
ⓓ a reddish-brown ppt. is formed at anode.

45 On electrolysis of chloride salt of an element from earth alkaline metals a current passed with intensity of 5 A to 784 seconds , 0.494g of the metal formed on cathode , What is the formula of the used salt ? [Ba = 137.3, Sr= 87.6 Ca=40.08 , Mg=24.3]

ⓐ $MgCl_2$ ⓒ $SrCl_2$
ⓑ $CaCl_2$ ⓓ $BaCl_2$

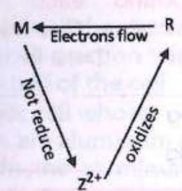
46 According to the following standard potentials:
Zn^{2+}/Zn [-0.762 V]
Mg/Mg^{2+} [2.375 V]
F^-/F_2 [-2.87 V]
Li^+/Li [-3.045]
So the strongest reducing agent is ....

ⓐ Li ⓒ F
ⓑ Li^+ ⓓ F_2

47 If metal (X) reacts with hydrochloric acid according to the following equation:
$X_{(s)} + 2HCl_{(aq)} \rightarrow XCl_{2\,(aq)} + H_{2(g)}$
In galvanic cell consists of electrode (X) with standard hydrogen electrode:

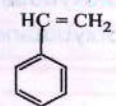
ⓐ mass of electrode (X) increases.
ⓑ EMF of this cell has negative value.
ⓒ electrons flow from X to SHE.
ⓓ concentration of H^+ ions increase.

48 Three metals M, R, Z have the following properties so the correct arrangement of them as a reducing agent is:

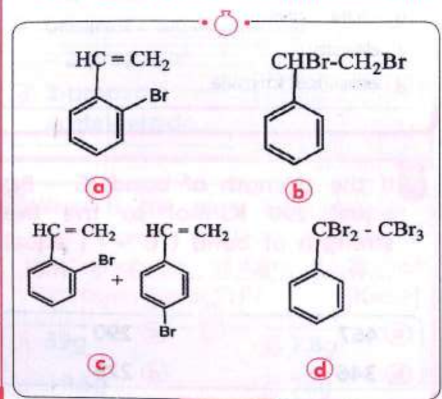


ⓐ Z > M > R
ⓑ R > M > Z
ⓒ R > Z > M
ⓓ M > R > Z

49 The following compound is styrene

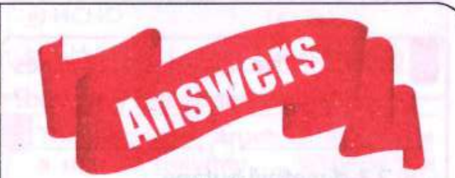


which is considered as derivative of benzene, this compound reacts with bromine water dissolved in CCl_4 and removes its color to form the compound ....



50 Which of the following compounds is an ester gives by its ammonolysis acetamide?

ⓐ $CH_3CH_2COOCH_3$
ⓑ $HCOOC_2H_5$
ⓒ $C_2H_5OOCCH_3$
ⓓ $CH_3COC_2H_5$



No.	Answer	No.	Answer
1	A	2	B
3	B	4	A
5	C	6	D
7	A	8	D
9	A	10	C
11	A	12	B
13	B	14	D
15	D	16	B
17	B	18	A
19	D	20	A
21	A	22	D
23	D	24	B
25	B	26	C
27	B	28	C
29	C	30	D
31	C	32	B
33	C	34	D
35	D	36	D
37	A	38	A
39	C	40	D
41	B	42	C
43	A	44	C
45	A	46	A
47	C	48	C
49	B	50	C

Chemistry



Bubble Sheet

رقم جلوس الطالب مظللاً

0	0	0	0	0	0
1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9

املأ البيانات الآتية كتابة:

الاسم: ....

رقم الجلوس: ....

المجموعة: ....

التاريخ: ....

نموذج رقم: 1 2 3 4

تعليمات هامة

- ممنوع استخدام الكوريكتور.
- يرجى استخدام القلم الرصاص للإجابة وبعد الإجابة يتم استخدام القلم الجاف .
- يركز تظليل الاجابة فى مركز الدائرة.

Ch . 1 :Transition Elements (40 Q)

40 ideas for Iron & its compounds

No.				
1	a	b	c	d
2	a	b	c	d
3	a	b	c	d
4	a	b	c	d
5	a	b	c	d
6	a	b	c	d
7	a	b	c	d
8	a	b	c	d
9	a	b	c	d
10	a	b	c	d
11	a	b	c	d
12	a	b	c	d
13	a	b	c	d
14	a	b	c	d
15	a	b	c	d
16	a	b	c	d
17	a	b	c	d
18	a	b	c	d
19	a	b	c	d
20	a	b	c	d
21	a	b	c	d
22	a	b	c	d
23	a	b	c	d
24	a	b	c	d
25	a	b	c	d
26	a	b	c	d
27	a	b	c	d
28	a	b	c	d
29	a	b	c	d
30	a	b	c	d
31	a	b	c	d
32	a	b	c	d
33	a	b	c	d
34	a	b	c	d
35	a	b	c	d
36	a	b	c	d
37	a	b	c	d
38	a	b	c	d
39	a	b	c	d
40	a	b	c	d

Ch . 1 :Transition Elements (40 Q)

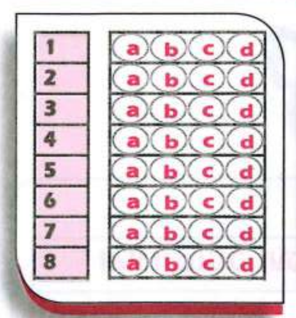
40 ideas for properties of the first transition series

No.				
1	a	b	c	d
2	a	b	c	d
3	a	b	c	d
4	a	b	c	d
5	a	b	c	d
6	a	b	c	d
7	a	b	c	d
8	a	b	c	d
9	a	b	c	d
10	a	b	c	d
11	a	b	c	d
12	a	b	c	d
13	a	b	c	d
14	a	b	c	d
15	a	b	c	d
16	a	b	c	d
17	a	b	c	d
18	a	b	c	d
19	a	b	c	d
20	a	b	c	d
21	a	b	c	d
22	a	b	c	d
23	a	b	c	d
24	a	b	c	d
25	a	b	c	d
26	a	b	c	d
27	a	b	c	d
28	a	b	c	d
29	a	b	c	d
30	a	b	c	d
31	a	b	c	d
32	a	b	c	d
33	a	b	c	d
34	a	b	c	d
35	a	b	c	d
36	a	b	c	d
37	a	b	c	d
38	a	b	c	d
39	a	b	c	d
40	a	b	c	d

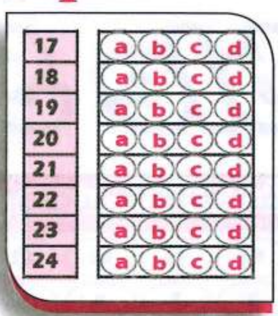


Ch . 2 : Chemical analysis (40 Q)

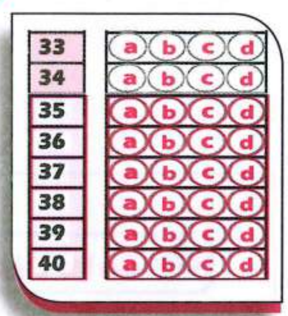
(40 ideas for qualitative analysis)



No.	Answer
9	a b c d
10	a b c d
11	a b c d
12	a b c d
13	a b c d
14	a b c d
15	a b c d
16	a b c d



No.	Answer
25	a b c d
26	a b c d
27	a b c d
28	a b c d
29	a b c d
30	a b c d
31	a b c d
32	a b c d



Ch . 2 :Chemical analysis (40 Q)

40 ideas for quantitative analysis



No.	Answer
21	a b c d
22	a b c d
23	a b c d
24	a b c d
25	a b c d
26	a b c d
27	a b c d
28	a b c d
29	a b c d
30	a b c d
31	a b c d
32	a b c d
33	a b c d
34	a b c d
35	a b c d
36	a b c d
37	a b c d
38	a b c d
39	a b c d
40	a b c d

Ch . 3 :Chemical equilibrium (40 Q)

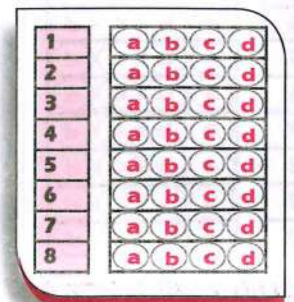
40 ideas for Equilibrium System – Reaction Rate

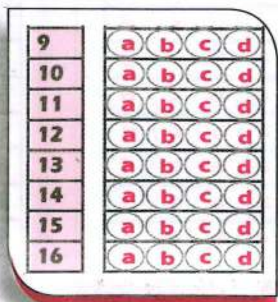


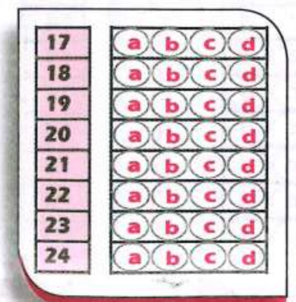
No.	Answer
21	a b c d
22	a b c d
23	a b c d
24	a b c d
25	a b c d
26	a b c d
27	a b c d
28	a b c d
29	a b c d
30	a b c d
31	a b c d
32	a b c d
33	a b c d
34	a b c d
35	a b c d
36	a b c d
37	a b c d
38	a b c d
39	a b c d
40	a b c d

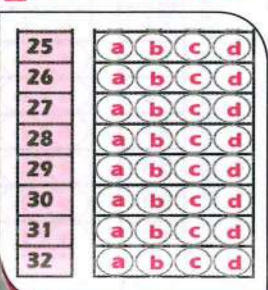
Ch . 3 : Chemical equilibrium (40 Q)

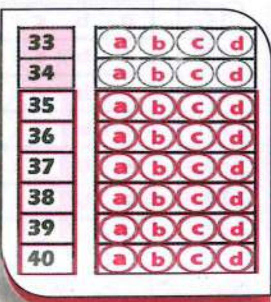
40 ideas for ionic equilibrium











Ch . 4 : Electrochemistry (40 Q)

40 ideas for galvanic cells

1	a	b	c	d
2	a	b	c	d
3	a	b	c	d
4	a	b	c	d
5	a	b	c	d
6	a	b	c	d
7	a	b	c	d
8	a	b	c	d

9	a	b	c	d
10	a	b	c	d
11	a	b	c	d
12	a	b	c	d
13	a	b	c	d
14	a	b	c	d
15	a	b	c	d
16	a	b	c	d

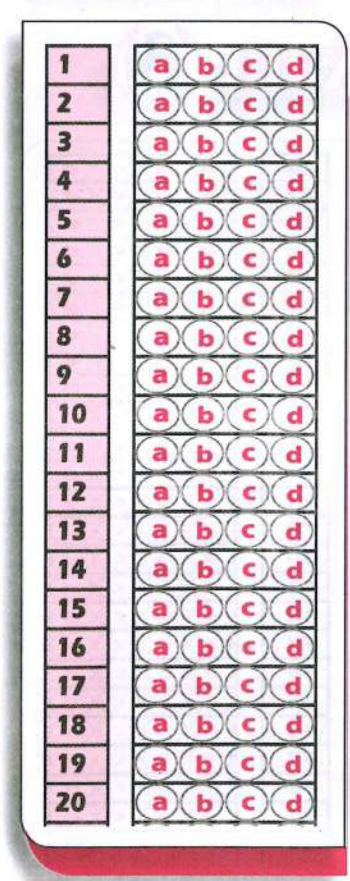
17	a	b	c	d
18	a	b	c	d
19	a	b	c	d
20	a	b	c	d
21	a	b	c	d
22	a	b	c	d
23	a	b	c	d
24	a	b	c	d

25	a	b	c	d
26	a	b	c	d
27	a	b	c	d
28	a	b	c	d
29	a	b	c	d
30	a	b	c	d
31	a	b	c	d
32	a	b	c	d

33	a	b	c	d
34	a	b	c	d
35	a	b	c	d
36	a	b	c	d
37	a	b	c	d
38	a	b	c	d
39	a	b	c	d
40	a	b	c	d

Ch . 4 : Electrochemistry (40 Q)

40 ideas for electrolytic cells



1	a	b	c	d
2	a	b	c	d
3	a	b	c	d
4	a	b	c	d
5	a	b	c	d
6	a	b	c	d
7	a	b	c	d
8	a	b	c	d
9	a	b	c	d
10	a	b	c	d
11	a	b	c	d
12	a	b	c	d
13	a	b	c	d
14	a	b	c	d
15	a	b	c	d
16	a	b	c	d
17	a	b	c	d
18	a	b	c	d
19	a	b	c	d
20	a	b	c	d

21	a	b	c	d
22	a	b	c	d
23	a	b	c	d
24	a	b	c	d
25	a	b	c	d
26	a	b	c	d
27	a	b	c	d
28	a	b	c	d
29	a	b	c	d
30	a	b	c	d
31	a	b	c	d
32	a	b	c	d
33	a	b	c	d
34	a	b	c	d
35	a	b	c	d
36	a	b	c	d
37	a	b	c	d
38	a	b	c	d
39	a	b	c	d
40	a	b	c	d

Ch . 5 :Organic chemistry (50 Q)

50 ideas for hydrocarbons

1	a	b	c	d
2	a	b	c	d
3	a	b	c	d
4	a	b	c	d
5	a	b	c	d
6	a	b	c	d
7	a	b	c	d
8	a	b	c	d
9	a	b	c	d
10	a	b	c	d
11	a	b	c	d
12	a	b	c	d
13	a	b	c	d
14	a	b	c	d
15	a	b	c	d
16	a	b	c	d
17	a	b	c	d
18	a	b	c	d
19	a	b	c	d
20	a	b	c	d
21	a	b	c	d
22	a	b	c	d
23	a	b	c	d
24	a	b	c	d
25	a	b	c	d

26	a	b	c	d
27	a	b	c	d
28	a	b	c	d
29	a	b	c	d
30	a	b	c	d
31	a	b	c	d
32	a	b	c	d
33	a	b	c	d
34	a	b	c	d
35	a	b	c	d
36	a	b	c	d
37	a	b	c	d
38	a	b	c	d
39	a	b	c	d
40	a	b	c	d
41	a	b	c	d
42	a	b	c	d
43	a	b	c	d
44	a	b	c	d
45	a	b	c	d
46	a	b	c	d
47	a	b	c	d
48	a	b	c	d
49	a	b	c	d
50	a	b	c	d



Ch . 5 :Organic chemistry (50 Q)

50 ideas for derivatives of hydrocarbons

Q				
1	a	b	c	d
2	a	b	c	d
3	a	b	c	d
4	a	b	c	d
5	a	b	c	d
6	a	b	c	d
7	a	b	c	d
8	a	b	c	d
9	a	b	c	d
10	a	b	c	d
11	a	b	c	d
12	a	b	c	d
13	a	b	c	d
14	a	b	c	d
15	a	b	c	d
16	a	b	c	d
17	a	b	c	d
18	a	b	c	d
19	a	b	c	d
20	a	b	c	d
21	a	b	c	d
22	a	b	c	d
23	a	b	c	d
24	a	b	c	d
25	a	b	c	d
26	a	b	c	d
27	a	b	c	d
28	a	b	c	d
29	a	b	c	d
30	a	b	c	d
31	a	b	c	d
32	a	b	c	d
33	a	b	c	d
34	a	b	c	d
35	a	b	c	d
36	a	b	c	d
37	a	b	c	d
38	a	b	c	d
39	a	b	c	d
40	a	b	c	d
41	a	b	c	d
42	a	b	c	d
43	a	b	c	d
44	a	b	c	d
45	a	b	c	d
46	a	b	c	d
47	a	b	c	d
48	a	b	c	d
49	a	b	c	d
50	a	b	c	d

Model exam (1)

Q				
1	a	b	c	d
2	a	b	c	d
3	a	b	c	d
4	a	b	c	d
5	a	b	c	d
6	a	b	c	d
7	a	b	c	d
8	a	b	c	d
9	a	b	c	d
10	a	b	c	d
11	a	b	c	d
12	a	b	c	d
13	a	b	c	d
14	a	b	c	d
15	a	b	c	d
16	a	b	c	d
17	a	b	c	d
18	a	b	c	d
19	a	b	c	d
20	a	b	c	d
21	a	b	c	d
22	a	b	c	d
23	a	b	c	d
24	a	b	c	d
25	a	b	c	d
26	a	b	c	d
27	a	b	c	d
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29	a	b	c	d
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31	a	b	c	d
32	a	b	c	d
33	a	b	c	d
34	a	b	c	d
35	a	b	c	d
36	a	b	c	d
37	a	b	c	d
38	a	b	c	d
39	a	b	c	d
40	a	b	c	d
41	a	b	c	d
42	a	b	c	d
43	a	b	c	d
44	a	b	c	d
45	a	b	c	d
46	a	b	c	d
47	a	b	c	d
48	a	b	c	d
49	a	b	c	d
50	a	b	c	d

Model exam (2)



Q				
1	a	b	c	d
2	a	b	c	d
3	a	b	c	d
4	a	b	c	d
5	a	b	c	d
6	a	b	c	d
7	a	b	c	d
8	a	b	c	d
9	a	b	c	d
10	a	b	c	d
11	a	b	c	d
12	a	b	c	d
13	a	b	c	d
14	a	b	c	d
15	a	b	c	d
16	a	b	c	d
17	a	b	c	d
18	a	b	c	d
19	a	b	c	d
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24	a	b	c	d
25	a	b	c	d
26	a	b	c	d
27	a	b	c	d
28	a	b	c	d
29	a	b	c	d
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33	a	b	c	d
34	a	b	c	d
35	a	b	c	d
36	a	b	c	d
37	a	b	c	d
38	a	b	c	d
39	a	b	c	d
40	a	b	c	d
41	a	b	c	d
42	a	b	c	d
43	a	b	c	d
44	a	b	c	d
45	a	b	c	d
46	a	b	c	d
47	a	b	c	d
48	a	b	c	d
49	a	b	c	d
50	a	b	c	d

Model exam (3)

Q				
1	a	b	c	d
2	a	b	c	d
3	a	b	c	d
4	a	b	c	d
5	a	b	c	d
6	a	b	c	d
7	a	b	c	d
8	a	b	c	d
9	a	b	c	d
10	a	b	c	d
11	a	b	c	d
12	a	b	c	d
13	a	b	c	d
14	a	b	c	d
15	a	b	c	d
16	a	b	c	d
17	a	b	c	d
18	a	b	c	d
19	a	b	c	d
20	a	b	c	d
21	a	b	c	d
22	a	b	c	d
23	a	b	c	d
24	a	b	c	d
25	a	b	c	d
26	a	b	c	d
27	a	b	c	d
28	a	b	c	d
29	a	b	c	d
30	a	b	c	d
31	a	b	c	d
32	a	b	c	d
33	a	b	c	d
34	a	b	c	d
35	a	b	c	d
36	a	b	c	d
37	a	b	c	d
38	a	b	c	d
39	a	b	c	d
40	a	b	c	d
41	a	b	c	d
42	a	b	c	d
43	a	b	c	d
44	a	b	c	d
45	a	b	c	d
46	a	b	c	d
47	a	b	c	d
48	a	b	c	d
49	a	b	c	d
50	a	b	c	d